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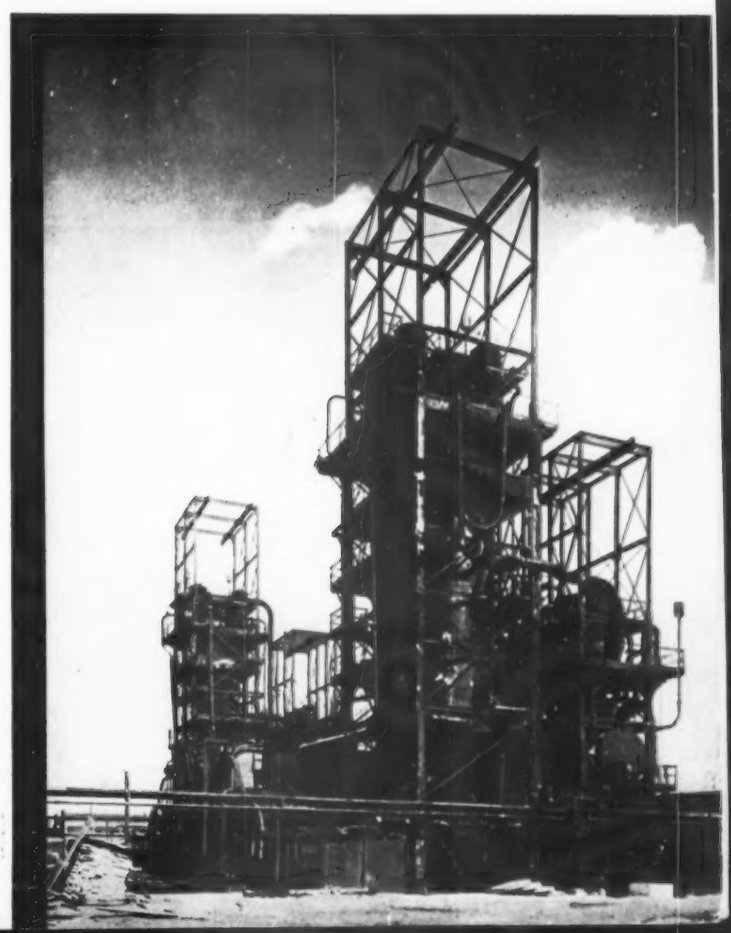

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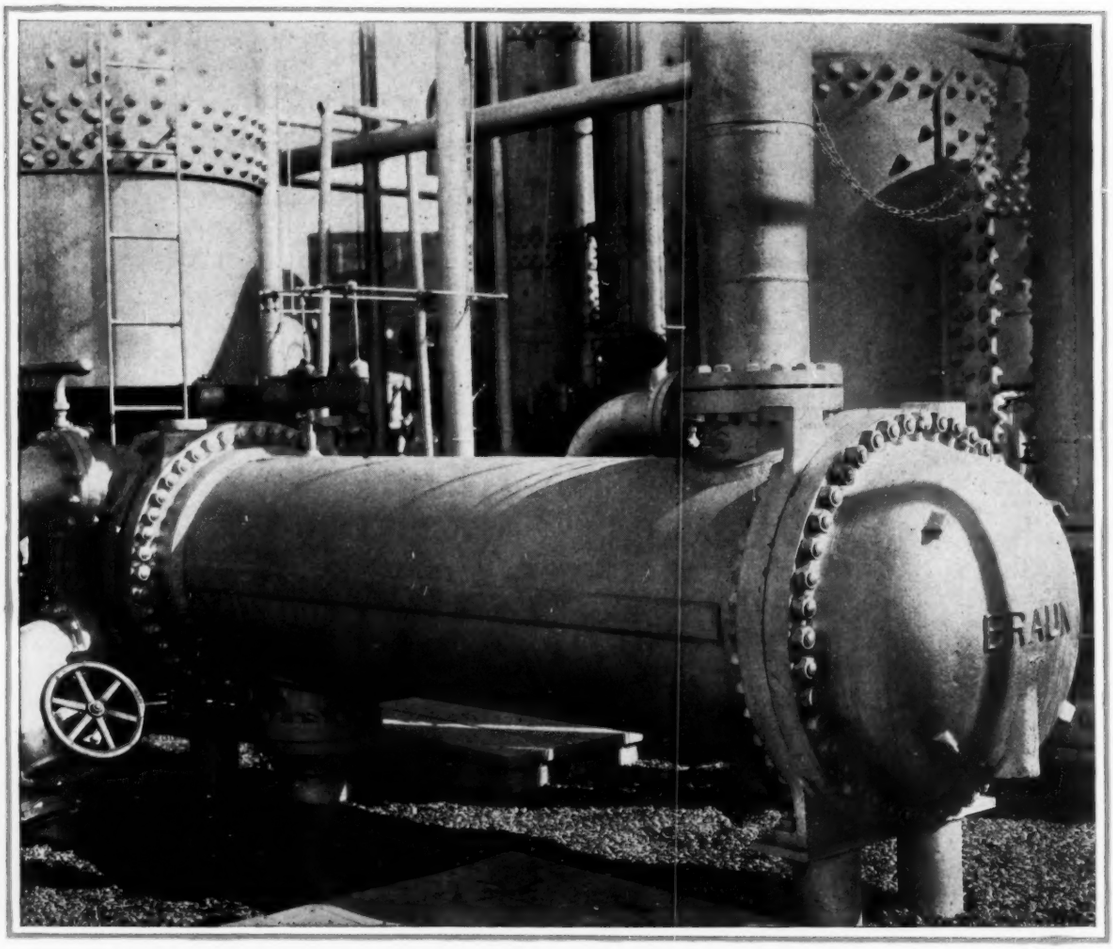

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JANUARY
1931

WORLD PETROLEUM

Executive-Editor, T. Orchard Lisle

VOLUME II NUMBER 1

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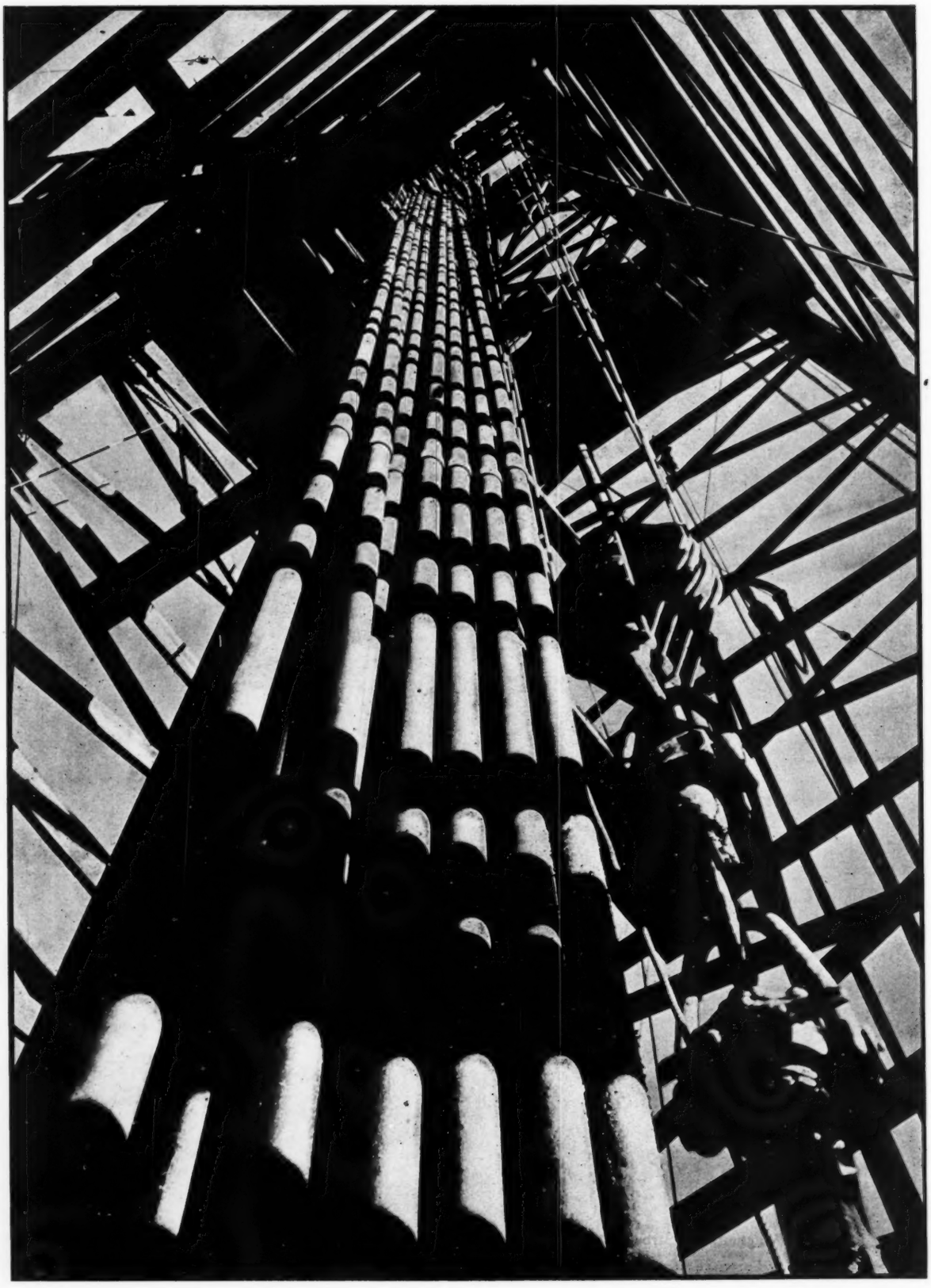

Oil derrick.

Margaret Bourke-White
Courtesy, The Texas Company

Geology
3-17-48

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PETROLEUM

THERE are many things inherent to human nature which are factors in producing situations leading to price cutting.

The Tail Wagging the Dog

One of these is playing an important part in the gasoline marketing chaos of today. It is that of the natural reactions of sales departments faced with lessened business, and their resultant influence on the heads of oil organizations. There unfortunately exists in some quarters an understandable tendency for chief-executives to attach too much weight to sales department reports of price cutting made by their competitors, with the ultimate result that policies are virtually formulated by the sales organization instead of by the man at the top. Sales divisions in self protection invariably explain a drop in sales by the business tactics of their rivals, and urge the meeting of believed unfair competition by similar methods. Meanwhile the salesmen of the other companies are adopting the same procedure, and unwittingly all the executives are *simultaneously* lowering prices, allowing excessive spreads between refinery and retail figures and extending too long credits, when in actual fact none of the companies may have made the step claimed by the salesmen. Serious price wars are unconsciously precipitated by such means even when there exists no substantial reason.

Today the unsound marketing situation is basically due to the lessened rate of growth of gasoline consumption following overproduction, and should be frankly recognized as such. Lower tankcar, or reduced roadside pump prices will not increase consumption one iota, regardless of the fact that the public is interested in the lowest available price for the best obtainable product. Oil company executives, individually and collectively, throughout the industry realize and admit the completely unsound status of present conditions. Yet excessive spreads between refinery and gasoline station prices, instead of being well on the road to elimination, have increased during recent months to the point where some refineries are getting less than two cents per gallon net. Pressure emanating from sales departments must be ignored, and the ball fearlessly started in the only direction to profitable marketing before improvement in the gasoline industry can be expected. The dog must waggle the tail and not the tail waggle the dog. Shrugging shoulders and saying—"What can *I* do *alone* to change matters when my competitors are doing these things"—will only let the present bad status of affairs carry along to a demoralizing condition bordering on chaos of the worst kind. The man who will boldly come forward with the essential and initial step will have his name written in indelible ink in oil history as one of the great leaders that critical periods have always produced. Once action is taken other petroleum company executives must follow to avoid business suicide. In fact they are all secretly praying for the opportunity to put their own business back on a profitable basis. All that is needed is a leader who dares lead!

▼

AT this critical period when gasoline stocks in the United States essentially need drastic reduction they are rising, regardless of the frank discussions at the recent A. P. I. meeting where the views of oil leaders along curtailment lines were clearly put forward. Crude production interests throughout the country have made curtailments and sacrifices beyond expectations—even if still inadequate, but it is hardly to be expected that they will continue with further cuts unless refineries do their share, especially as they have been receiving less money per barrel instead of the increase to which they are justly entitled. Every day important men of the industry make statements to the daily press as to what must be done to rectify existing evils, but practically everyone of them sits back and waits for the other fellow to act instead of leading the way. Meanwhile, at the time of writing, the week's crude production in America has dropped to the lowest for the year (1930), but gasoline stocks have increased by nearly half-a-million barrels.

Refining Commonsense

Production in several other of the leading countries also has dropped and it is highly desirable that the entire world collaborate. In this the United States—as the largest producer, refiner, and exporter—must show the way to the oil companies of other nations. How can America expect Russia, for instance, to modify her enormous petroleum program which already is making inroads on the valuable gasoline

export business of the United States, unless an example is set. Seeing that 80 per cent of the entire American refinery output is controlled by 17 large companies it should not be difficult for their chief-executives to individually cut down on gasoline output to a sensible potential, and each notify the other 16 companies of their plan, without any question of becoming embroiled in the Sherman law. It is one of the vital and essential steps for the betterment of conditions in the petroleum industry. At present it seems that refinery operating executives are listening too closely to their legal departments instead of practicing what commonsense and sound economic reasoning must surely urge. The U. S. Assistant Attorney-General went as far as he could in his recent suggestions to oil leaders and his statements consequently should be read between the lines. If the component parts of the 80 per cent will act individually, and without agreement, along the lines best for the industry in general the remaining 20 per cent must follow, and the Government is not likely to interfere.

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A Colombian Viewpoint

ELSEWHERE in this issue is reviewed an interesting work written in Spanish by a Colombian oil man and just published in Bogota in an endeavor to picture the Latin-American viewpoint of oil exploitation in Colombia by the companies of other nations. Using as a major argument the angle that as independent American oil interests are urging an import tariff on South American crudes, the existing 10 per cent cash or kind royalty is obviously inadequate; that an export tax of 10 to 40 cents per barrel should be imposed on the grounds that if Colombian crude can be sold at such low prices as to warrant a U. S. duty then the taxation should be imposed at the point of exit rather than at the port of entry. Senor Gonzalez, the author, apparently has not taken into full consideration the fact that the present low prices of Colombian crude also applies to the oil of other countries and is entirely the result of overproduction simultaneously with a slow-up of the rate of consumption throughout the world. In other words it is now a buyer's market and the buyer today can virtually dictate his own price. It is quite possible that at the moment Colombian oil is being marketed at cost, if not at a loss. To shut down production entirely because of existing low market prices would be disastrous to both Colombia and to the oil interests operating in that country. Production must go on, curtailed perhaps and the best price obtained, even if that price is below U. S. midcontinent figures. Otherwise it will have no market. On the matter of local tax or royalty it is well to take in consideration the fact that before the one company producing commercially in Colombia shipped a single barrel of oil it spent $66,000,000 in preliminary operations. Up to recently a little over 84,000,000 barrels of petroleum have been produced in Colombia.

▼

A Strong Consolidation

WITH this issue of WORLD PETROLEUM is consolidated the export oil equipment journal, PETROLEUM EQUIPMENT EXPORTER. The combined magazines will be published under the name WORLD PETROLEUM, and all the important features of the older publication will be incorporated and carried on in our editorial pages. Advertisers will enjoy the benefits of the joint circulation, which now forms the largest and most influential international distribution of any petroleum and petroleum equipment publication in the World, both in overseas fields and refineries and in executive offices of more than sixty countries. WORLD PETROLEUM during its first year of operation made remarkable progress, and is recognized by international oil men as the outstanding oil journal of today. The strong position already attained is strengthened by this consolidation. To the large number of new and old readers the publisher extends cordial greetings, and assurances that everything possible will be done to make the journal of the greatest interest and value to them individually, as well as to the petroleum industry as a whole.

▼

Imports and Exports

BUYING and selling is the very soul of modern civilization, and successful selling cannot continue whenever it is one sided. To buy and sell within a restricted area is to limit trade to requirements of the restricted area. No country can be very prosperous if it buys and sells exclusively within itself. For its people to expand and for the standard of their scale of living to be raised to a high plane, trade with other countries is essential to augment domestic business. Consequently a study of the petroleum import and export trade of the United States provides food for reflective thought. Before us are Department of Commerce figures for the first ten months of 1930. These figures cover both quantity and value, and show a trade balance in favor of the United States of $291,420,358. In terms of barrels of crude and refined products, the balance in favor of America is 36,515,398 bbls. It is important to note that most of our exports were refined products, the quantity of which was over five times that of crude, and its value more than thirteen times that of exports of crude. These figures are as follows:

EXPORTS FROM THE UNITED STATES
(First 10 months of 1930)

	Crude	Refined Products
Quantity	20,600,290 bbl.	106,138,339 bbl
Value	$28,651,352	$387,387,833

Of late there has been continuous agitation in mid-continent fields for a tariff on imports of crude and refined oils, on the grounds that if imports were shut off it would greatly relieve the over production situation in the United States and make for better prices. If this were actually the case, it would be well for Congress, so far as the domestic petroleum industry is concerned, to support the traditional American policy of protection to home industry with its high wages and scale of living. As will be seen in the foregoing table, enormous quantities of mid-continent crude and refined products are being purchased by foreign countries, and these greatly exceed our importations. Everything tends to indicate that a tariff at this time would simply divert to the world's other markets crude and refined products now being imported. And, as methods of production of crude and refined products in the Caribbean are more efficient than they are in the United States, the present enormous quantity of refined oils from the mid-continent now going abroad would be reduced to a greater extent than the quantity of oils now coming in, and consequently accentuate present overproduction conditions.

When taking into consideration the fact that our total petroleum exports for the first ten months of 1930 amounted to $416,039,185, the matter is of a serious nature, and should not be handled with undue haste.

America excels in quantity production in everything but the oil industry, where methods are extremely wasteful and

(Continued on page 41)

Conditions in U. S. Petroleum Industry

Report of Committee On Petroleum Economics of the Federal Oil Conservation Board. Nation's Gasoline Inventory Next Spring Should Not Exceed 40,000,000 Barrels. . . .

THE petroleum industry entered the currrent business depression with excessive plant capacity, large inventories, and an enormous drilled-up potential supply of crude oil. During the first six months of the depression, the demands for petroleum products were only moderately retarded, and thus the curtailment schedules in effect in the industry were sufficient to keep supply and demand in approximate balance, although unfortunately no material progress was made toward the liquidation of inventories or in the reduction of drilling and capital expansion. In the late spring, however, the aggravated severity of the business depression led to a much more adverse decline in oil consumption, until in the summer the demand for gasoline and for all oil products had fallen approximately 7 per cent below the levels considered normal for that period. This supplementary drop in consumption, together with the uncertainty of the duration of the lower figures, creates a new and perplexing problem for the petroleum industry to meet, and additional curtailment of both refinery operations and crude oil production.

In pointing to the need for further curtailment of current supplies, the committee feels that there may exist in the industry considerable misunderstanding as to the rôle of supply curtailment and the benefits to be derived from such action. It perhaps should be stated that curtailment of current supply is in the nature of an emergency measure, and should not be expected to provide a cure for the funddamental economic maladjustments existing in the petroleum industry, which arise from the circumstance that this activity is over-developed, over-capitalized, and rests upon an unsound method of competitive offset drilling. Curtailment of production alone cannot remedy these conditions; to reach the root of the difficulty will require restriction of drilling, abridgment of plant expansion, and a modernization of the prevailing method of crude oil production to place this department of the business in low-cost brackets and on a competitive basis with the rest of the world. Curtailment of supply, however, is essential to sustain the industry pending more fundamental adjustments, but the difficulties involved in curtailment of supply should not be permitted to obscure the larger issue with which this report, by definition, is not directly concerned.

CURTAILMENT of current supply is in the nature of an emergency measure, and should not be expected to provide a cure for the fundamental economic maladjustments existing in the petroleum industry, which arise from the circumstance that this activity is over-developed, over-capitalized, and rests upon an unsound method of competitive offset drilling Curtailment of production alone cannot remedy these conditions; to reach the root of the difficulty will require restriction of drilling, abridgment of plant expansion, and a modernization of the prevailing method of crude oil production to place this department of the business in low-cost brackets and on a competitive basis with the rest of the world. Curtailment of supply, however, is essential to sustain the industry pending adjustments.

The committee desires to point out further that the Kettleman Hills and Belridge areas of California have enormous potentialties for the manufacture of low-cost gasoline; and unless these areas are promptly brought under a plan of unit operation, much more drastic restrictions in refinery operations and crude oil production than are shown in this report will be required in all other districts. These areas, if competitively drilled, have the capacity for perpetuating overproduction for a considerable period.

The problem of estimating the crude oil requirements of the country must be approached through an analysis of the prospective consumption of gasoline, the principal product of crude petroleum, and a translation of the gasoline demand into the domestic crude oil needed to provide the necessary gasoline. The problem is complicated by the impossibility of accurately gaging future demand at a time of acute economic unsettlement, as well as by the variations possible in the volume of components that go to make up the gasoline supply. To meet these difficulties a range of estimates is presented which will serve to show the great significance of relatively small differences in demand and the leverage effect of changes in the supply of cracked and imported gasoline; and from this range the most probable figures may be selected.

The past statistics used in this report and employed as a basis for the calculations are taken from the published reports of the Petroleum Division of the U. S. Bureau of Mines.

The consumption of gasoline in recent months has been sharply diverted downward from its normal course by the business depression. To forecast the demand for gasoline over the next six months, in consequence, requires a specific knowledge of the trend of business activity during that period. The basis for an accurate forecast of business over the near-term future is not available; and, therefore, a dependable prediction of gasoline consumption can-

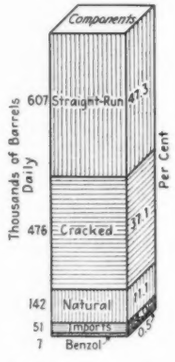
not be given. In major depressions, however, so far as evidence is available, gasoline consumption is drastically affected and shows a lag of several months in following business activity, both on the downturn and on the upturn. During the third quarter of the year, gasoline consumption was running about 7 per cent below a level calculated as normal; and, with the business outlook still obscure, the prospects for a favorable gasoline demand during the period under consideration are not promising. In the absence of a basis for precision, a range of demands from a decrease of 4 per cent to an increase of 4 per cent has been forecasted, and this spread seems likely to include the actual developments. (See Table 1.) Present evidence is suggestive that demand is apt to run toward the central or lower measures of this range.

To translate this demand range into supply quotas requires the selection of a gasoline inventory objective for the end of the period March 31, 1931. The American Petroleum Institute has recently ascertained, through questionnaires, that an adequate gasoline working stock for September 30 is 29 million barrels, which when adjusted for natural gasoline is reduced to 27.2 million barrels. Seasonally corrected, the latter figure becomes 38.8 million barrels on March 31. While around 40 million barrels, therefore, appears a desirable inventory for next spring, the committee has used 45 million barrels, because of the shortness of the intervening liquidation period and the difficulty of attaining the lower figure. In Table 1, however, the calculations have been made on the basis in turn of 40, 45, and 50 million barrels, so that the effect of varying inventory assumptions may be observed.

It may be read from Table 1 that a break-even demand, with an inventory objective of 45 million barrels for next spring, will require a curtailment of 7 per cent in the gasoline supply from the estimated October rate. Should demand show a decline of 4 per cent, a curtailment of 10 per cent would be required. It is seen further that to gain an inventory position of 40 million barrels, instead of 45 million barrels, an additional curtailment of 2 per cent would be necessary.

Relation of Gasoline Demand to Domestic Crude Oil Requirement

To convert gasoline demand into a domestic crude oil requirement necessitates a consideration of the alternate sources from which gasoline is derived. The gasoline or motor fuel supply, is made up of five components: Straight-run gasoline, obtained from crude oil by distillation; cracked gasoline, manufactured from gas and fuel oil; natural gasoline, extracted from natural gas; imported gasoline; and benzol. The composition of the gasoline supply in September, 1930, was as follows:



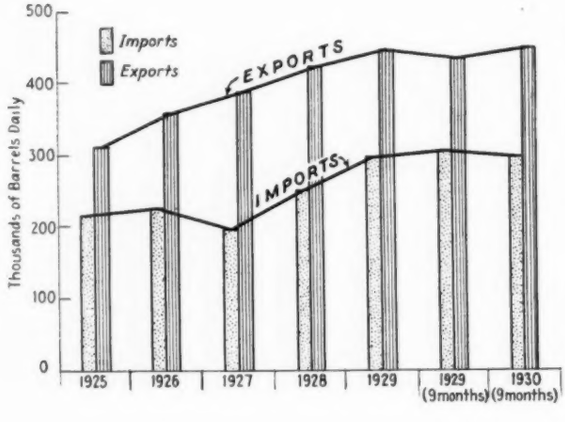
Composition of gasoline stocks, September, 1930.
(World Petroleum diagram)

Components	Thousands of Barrels Daily	Per Cent
Straight-run	607	47.3
Cracked	476	37.1
Natural	142	11.1
Imports	51*i*	4.0
Benzol	7	0.5
Total	1,283	100.0

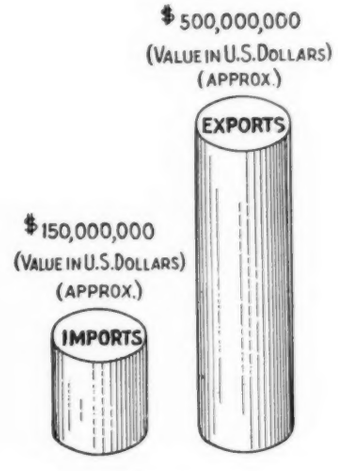
i Largely cracked gasoline.

It is seen that less than half the supply of gasoline is derived *primarily* from crude oil; hence the variations in the other components of gasoline have a profound influence upon the demand for crude oil. Each barrel of gasoline from the other sources replaces *four* barrels of crude oil. This relationship is of far-reaching importance in the economics of petroleum.

In Table 2 is presented a series of gasoline demands translated into domestic crude oil requirements, on the assumption that the other components of the gasoline supply are maintained at the estimated October rate with the entire required adjustment made in straight-run refining. A glance at this table reveals, on the basis shown, that the domestic crude oil requirements will range from 1,910,000 bbl. per day to 2,270,000 bbl. per day, according to the rate of change in gasoline demand. A break-even demand calls for 2,090,000 bbl. daily of domestic crude oil. These figures suggest such a drastic curtailment in crude oil production that it seems desirable to consider whether the other components of gasoline cannot be adjusted so that the burden of curtailment would fall less heavily upon the crude oil producer. Cracked gasoline is subject to restriction by the shut-down of cracking stills; this adjustment can be made with minimum dislocation to the crude oil situation, but such action is hindered by the competitive sale of anti-knock gasoline, whose quality would



Left,—Comparison of U. S. imports and exports in thousands of barrels in 1929.
(World Petroleum diagram)



Right,—Illustrating comparative values of U. S. imports and exports of petroleum products and crudes in 1929.
(World Petroleum diagram)

suffer if the supply of cracked gasoline were curtailed. Natural gasoline is a by-product, and its supply is not readily subject to control. Imports of gasoline could be cut down by manufacturing less at the source. Benzol is negligible in volume, and may be disregarded. Despite difficulties, all sources of gasoline supply can be reduced, if necessary.

Table 3 shows the effect of varying gasoline demands upon runs to stills and domestic curtailment of the gasoline supply is applied on the same percentage basis to all sources of gasoline. It may be observed, on this basis, that a break-even demand will exact a reduction (from the estimated October rate) of 4.5 per cent in refinery runs, and a like cutting down (from the October 18 rate) in the domestic output of crude oil. Further, each variation of 1 per cent in the demand factor requires a corresponding adjustment of 1 per cent in the degree of curtailment; that is, if gasoline demand drops an additional 1 per cent, an extra 1 per cent of curtailment will be required, and *vice versa*. In view of the relationships brought out in Tables 2 and 3, the committee feels that the present emergency calls for a reduction in all sources of gasoline supply, despite the inefficiency of maintaining idle crackers, although a restriction of cracking can be justified only on the basis of expediency.

Domestic Crude Requirements

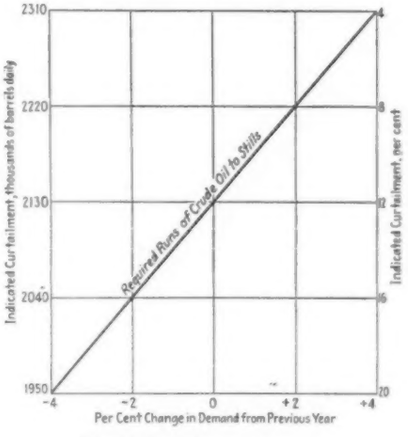
Having calculated a range of domestic crude oil requirements, depending upon the demand for gasoline, the inventory objective for next spring, and the type of curtailment adopted by refiners, we now approach the problem of allocating the requirements to the principal oil producing areas. After consideration of the various aspects of this matter, the committee suggests an allocation based with slight modification upon recent proration schedules in the principal producing areas, on the assumption that such programs represent a practical adjustment in the direction of developing tendencies. This allocation, under varying gasoline demands, is presented in Table 4. It is seen from this table that a break-even demand, for example, calls for the following domestic production, with the figures varying about 1 per cent with each change of 1 per cent in the rate of demand:

	Thousands of Barrels Daily
California	542
Oklahoma	542
Texas	730
Others	456
Total, U. S.	2,270

The figures shown above and in Table 4 have not been adjusted for overage between October 1 and such time as additional curtailment may be affected. For each month that elapses from October 1, an additional curtailment of approximately 1 per cent will be required to compensate for the overage factor. It may be pointed out, further, that because of their extremely high gasoline content, the Kettleman Hills and Belridge areas of California, if actively produced, will call for additional downward adjustments in the allocation figures.

Bearing of Curtailment Upon Fuel Oil

The foregoing analysis indicates that no increase in gasoline demand, under the assumptions previously outlined, calls for domestic runs to stills of 2,310,-



World Petroleum diagram visualizing table 2.

000 bbl. per day and domestic crude oil production of 2,270,000 bbl. per day. The question arises whether such a schedule will provide sufficient other products. Upon analysis, no deficiencies arise, except possibly in the case of fuel oil east of California, and this contingency depends in part upon the extent to which fuel oil demand is adversely affected. Present evidence suggests that refinery runs of 2,310,000 bbl. per day, or less, will lead to heavy drafts on fuel oil stocks east of California; but a deficiency, if it arises, can be made up in several or all of the following ways; by increasing the canal movement from California where stocks are excessive; by reducing cracking further; by running a larger proportion of heavy crudes; by increasing the imports of Venezuelan and Mexican crude and fuel oil; and by decreasing the imports of foreign gasoline.

The committee feels that a sound gasoline schedule should not be permitted to be upset by fuel oil commitments, as a local deficiency of fuel oil would be readily self-corrective.

Check on Supply Through Inventory Control

It is possible to set up a control of supply without estimating in advance the demand for gasoline. This may be done through pre-determining monthly inventories that would conform to desired operating schedules, and then adjusting supply from time to time in order to hold inventories to the prescribed levels. Table 5 is presented as a suggested course of gasoline and crude oil inventories, which would lead to gasoline stocks of 45 million barrels on March 31, 1931, and no change in crude oil stocks. While the committee favors liquidation of crude oil inventories, which are regarded as far too large, it seems doubtful if liquidation can be accomplished this winter at a time when the seasonal and cyclical factors are both adverse. For the future, however, the committee favors a reduction of crude oil stocks at the rate of 100,000 bbl. daily for an indefinite period; at this rate seven years would be required to cut domestic crude oil stocks in half.

Analysis of the Import Situation

Imports of all oils into the United States are approximately 300,000 bbl. per day. This quantity represents about 10 per cent of the total supply of all oils in this country. The trend of imports and the ratio of imports to total supply are shown in Table 6.

An analysis of imports, sub-divided into crude petroleum gasoline, and other petroleum products, is presented in Table 7. During the past three years, imports of crude petroleum have declined; but imports of gasoline and other products (mainly fuel oil) have increased. This is particularly true of the first nine months of this year as compared with the corresponding period of last year. This change has been brought about chiefly through the expansion of refinery operations in and near Venezuela. The marked recent increase in the imports of gasoline has been a factor in the general over-supply of gasoline, though a less important one than refinery expansion in this country. Imports of gasoline in the first nine months of

1930 represented 3.8 per cent of our total supply of motor fuel during this period; in September, the proportion was 4.0 per cent.

While imports of oil into the United States are substantial, they are less than the exports of oil from the United States, and have been for a long period. (See Table 8.) This country, therefore, is a net exporter of oil. During the first nine months of 1930, 10 per cent of our total supply of oil was imported, while 15 per cent was exported.

In respect to the adjustment of supply to demand over the six months under consideration in this report, it would be helpful if imports of gasoline were curtailed; but a restriction of importations of heavy crude and fuel oil might lead to a shortage of fuel oil in the coastal regions, and would impair the gasoline situation if equivalent quantities of fuel oil were obtained by refining higher-grade crudes.

The oils imported into the United States are in general lower-cost than domestic oils. The primary cause for this difference is that foreign oil fields more largely employ the principles of unit operation, with their attendant efficiencies, than do American oil fields. One remedy for this condition would be greater progress toward unit operation in this country.

TABLE 1

Refinery Curtailment Necessary to Meet Varying Demands for Gasoline During the Six Months Ending March 31, 1931.

Gasoline Demand 6 Months Ending March 31, 1930 (Millions of Barrels)	Assumed Change in Demand (Per Cent)	Indicated Demand 6 Months Ending March 31, 1931 (Millions of Barrels)	Supply Estimated October Rate (Millions of Barrels)	Change in Stocks[i] (Millions of Barrels)	Curtailment of Gasoline Supply from Estimated October Rate to Result in Stocks on March 31, 1931		
					40 Million Barrels (Per Cent)	45 Million Barrels (Per Cent)	50 Million Barrels (Per Cent)
208	—4	200	230	+30	—12	—10	—8
208	—2	204	230	+26	—10	—8	—6
208	0	208	230	+22	—9	— 7	—5
208	+2	212	230	+18	— 7	— 5	—3
208	+4	216	230	+14	— 5	— 3	—1

[i] Stocks September 30 were 38.3 million barrels.

TABLE 2

Effect Upon Domestic Crude Oil Consumption of Varying Rates of Gasoline Demand, Assuming Gasoline Stocks of 45 Million Barrels on March 31, 1931, and All Curtailment of Gasoline Supply (From the Estimated October Rate) Confined to Straight-Run Refining

Period Covered: 6 Months Ending March 31, 1931

Per Cent Change in Gasoline Demand from Previous Year	Required Runs of Crude Oil to Stills (Thousands of Barrels Daily)	Indicated Curtailment from Estimated October Rate (Per Cent)	Domestic Crude Oil Required (Thousands of Barrels Daily)	Indicated Curtailment from October 18 Rate (Per Cent)
—4	1,950	—20	1,910	—20
—2	2,040	—16	2,000	—16
0	2,130	—12	2,090	—12
+2	2,220	— 8	2,180	— 8
+4	2,310	— 4	2,270	— 4

TABLE 3

Effect Upon Domestic Crude Oil Consumption of Varying Rates of Gasoline Demand, Assuming Gasoline Stocks of 45 Million Barrels on March 31, 1931, and Curtailment of Gasoline Supply (From the Estimated October Rate) Applied on the Same Percentage Basis to All Sources of Gasoline

Period Covered: 6 Months Ending March 31, 1931

Per Cent Change in Gasoline Demand from Previous Year	Required Runs of Crude Oil to Stills (Thousands of Barrels Daily)	Indicated Curtailment from Estimated October Rate (Per Cent)	Domestic Crude Oil Required (Thousands of Barrels Daily)	Indicated Curtailment from October 18 Rate (Per Cent)
—4	2,220	—8.5	2,180	—8.5
—2	2,270	—6.5	2,230	—6.5
0	2,310	—4.5	2,270	—4.5
+2	2,360	—2.5	2,320	—2.5
+4	2,410	—0.5	2,370	—0.5

TABLE 4

Effect Upon Allocation of Crude Oil Consumption of Varying Rates of Gasoline Demand, Assuming Gasoline Stocks of 45 Million Barrels on March 31, 1931, and Curtailment of Gasoline Supply (From the Estimated October Rate) Applied on the Same Percentage Basis to All Sources of Gasoline

Period Covered: 6 Months Ending March 31, 1931
(In Thousands of Barrels Per Day)

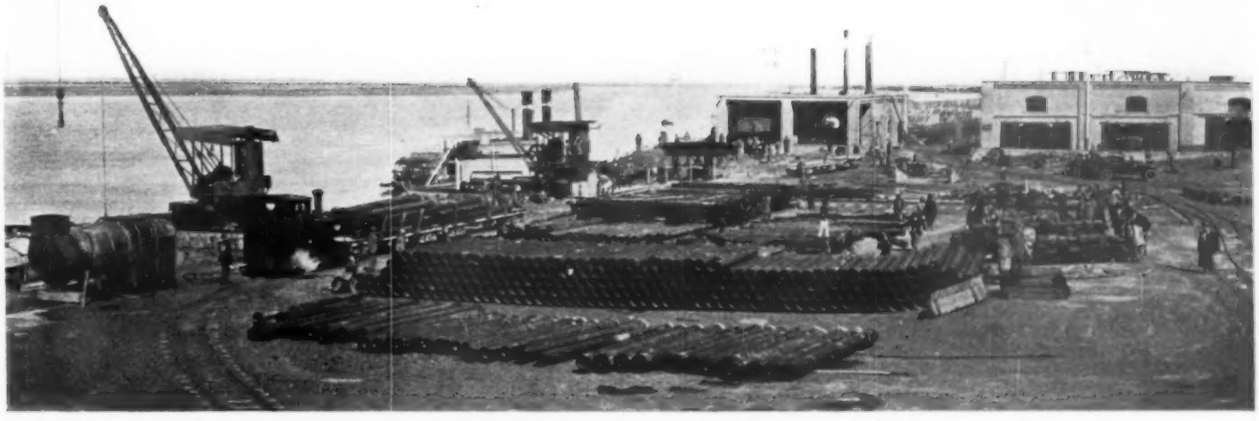
Areas	Suggested Percentage Allocation (Per Cent)	Suggested Allocation Basis Following Changes in Gasoline Demand				
		—4 (Per Cent)	—2 (Per Cent)	0	+2(Per Cent)	+4(Per Cent
California	23.9	521	533	542	555	567
Oklahoma	23.9	521	533	542	555	567
Texas	32.1	700	716	730	745	761
Others	20.1	438	448	456	465	475
Total, United States	100.0	2,180	2,230	2,270	2,320	2,370

Summary

The demand for gasoline for the six months ending March 31, 1931 cannot be closely estimated, but present evidence suggests that it will not exceed last year's and may even be less. The committee believes that it would be desirable for the industry to adjust its operations to an unchanged gasoline demand as a maximum. The industry is now operating on a basis geared to a 7 per cent increase in gasoline consumption. It is obvious, therefore, that a substantial reduction in operating rates is called for. A curtailment to balance a break-even demand for gasoline will require a reduction of 7 per cent from the estimated October rate of gasoline supply, if gasoline inventories next spring are not to exceed 45 million barrels.

If a reduction of 7 per cent in the supply of gasoline is spread on an even percentage basis over the various sources of gasoline, then a crude-run-to-stills of 2,310,000 bbl. per day and a domestic crude oil production of 2,270,000 bbl. per day are indicated. Should gasoline demand prove more adverse, or refiners confine their gasoline curtailment to straight-run operations, additional restriction of refinery runs and crude oil production would be called for, and tables are presented to cover these contingencies. If, on the other hand, demand should turn out to be more favorable, then the inventory situation may be permitted the benefit. A domestic crude oil production of 2,270,000 bbl. per day, corrected for estimated overage to date, becomes 2,240,000 bbl. per day, and the latter figure may be allocated as follows (or other quotas in proportion): California, 535,000; Okla-

(Continued on page 54)



Oilfield store wharf at Ahwaz, Persia.

Controlled Production on a Great Scale

Economic and Scientific Advantages Derived From the Full Control of One Geological Field in Persia Foreshadows Benefits From Unit Operation if Fully Applied in America. . . .

ONE fundamental need of the oil industry at this time is controlled production. Producing companies not yet convinced of the value of unit operation and proration should make a careful study of what has been done in a field where controlled production is virtually 100 per cent. The supreme advantages of such control are practically exemplified in the valuable work that the Anglo-Persian Oil Company is doing at the Masjid-i-Sulaiman (Solomon's Temple) and Haft Kel fields in Persia, where favorable circumstances of political economy, commerce, and nature have given the British company an ideal experimental ground for those scientific and economic lessons which this company alone is demonstrating to the world's petroleum industry. The present unsatisfactory conditions bordering on chaos in Roumania and the United States are directly due to individual indiscriminate extraction of crude from the big pools to prevent legalized robbery by the producer's neighbors. The crowding of wells on town lots has produced the disastrous effects now afflicting the industry.

The story of controlled production in Persia really goes back to the days when the illuminating value of petroleum formed its greatest marketing value. When the illuminating importance of oil diminished with the increased use of electricity, its transportation powers became paramount and is increasing with the development of modern life. Its importance is of stupendous significance in modern economy, but at no time was this more clearly demonstrated than during the crisis of the Great War of 1914-1918. The man first to see this significance was Admiral Lord Fisher of the British Navy who in 1882, long before oil became the power of transportation it is now, realized that the "use of oil adds 50% to the value of any fleet" as later he propounded, and ultimately resulted in the British Government's interest in the development of the Persian oil fields. Oil is "as necessary as blood in the battles of tomorrow," said Georges Clemenceau to President Wilson in 1917.

A geologist in the field, near Tembiun.

The oil resources of the world have always been a sort of enigma. Whereas in 1922 reputable technical and geological authorities were claiming that within a decade or two the oil supplies of the United States would be exhausted, a distinguished authority at the Fuel and Power Conferences held in London in 1928 was estimating that the world could rely on its gasoline supply for centuries to come. Deep-well drilling certainly has changed all estimates of oil reserves in the past few years.

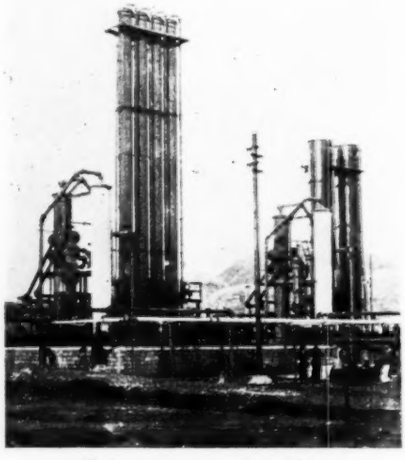
William Knox D'Arcy deserves in British overseas history a place alongside Wolf and Clive as an empire

On the hill to the left can be seen the great road to the oil fields built by the Company.

builder, with the additional merit that D'Arcy was not only an empire builder in the economic sense of the phrase, but also the preserver of the empire in the physical sense if, as Lord Fisher claimed, oil was the sine qua non of empire existence. It remained for Sir Henry Deterding and Sir John Cadman to carry on the tradition and to develop the idea of the British conquest of the oil resources of the world, and with these four world figures—Fisher, D'Arcy, Deterding and Cadman—we have the sum and substance of the present British challenge for the world's oil supremacy.

D'Arcy was the pioneer petroleum explorer in Persia, and the Anglo-Persian Oil Company was his creation. Anglo-Persian was registered in the United Kingdom on April 14, 1909, to operate its 60 year concession in Persia. It took the place of the original First Exploitation Company of 1903, and Lord Greenway is its President, with Sir John Cadman as Chairman of the Board.

It is in the history of the Anglo-Persian that we find those reminders of much of the world's history during the past decade. Apart, however, from its historical interest, Anglo-Persian has the merit of being likewise a pioneer in the scientific exploration and exploitation of the oil resources of the world. This enviable position was made possible by two basic facts—its close association with British Imperial policy, and its absolute control of a complete geological oil field. Two of the directors of the company are chosen by the British government. We here in the United States are envying that company, whatever it be, which can control a field or even half a field, which is free from the desperate pressure of competitive drilling, competitive storing, refining and marketing. With field operations at leisure and exclusive, Anglo-Persian today has a great object lesson to offer the petroleum industry. It has influenced us in titling this review—"Controlled Production on a Great Scale." By the word "great" we mean in the sense that it covers two entire oil fields in Persia, and the very substantial annual production of over 45,000,000 bbl. attained in 1929 and over 35,000,000 for the first ten months of 1930 representing the oil which the Company can now economically market.



Twin gas absorption plant at Masjid-i-Suliman.

Oil field at Masjid-i-Suliman, showing Anglo-Persian field headquarters in center.

Covering concessions of 500,000 square miles in Persia, and concessions in Iraq (not yet functioning commercially), Anglo-Persian's operations rank fifth in world importance. Yet its working capital is only about one-seventeenth of that of the world's leading oil company. Compared with the vast capital needed for indiscriminate and non-regulated drilling and production by hundreds of small companies in Oklahoma and California the Anglo-Persian's financial requirements are less than one-tenth. Production of crude consequently is extremely economical. The only way in which America can hope to compete and maintain its tremendous export petroleum business, and still maintain a profit on the same, is to reduce its production costs through central control, such as unit operation. . . .

Gas separators for separating the gas from the oil as it flows from the wells.

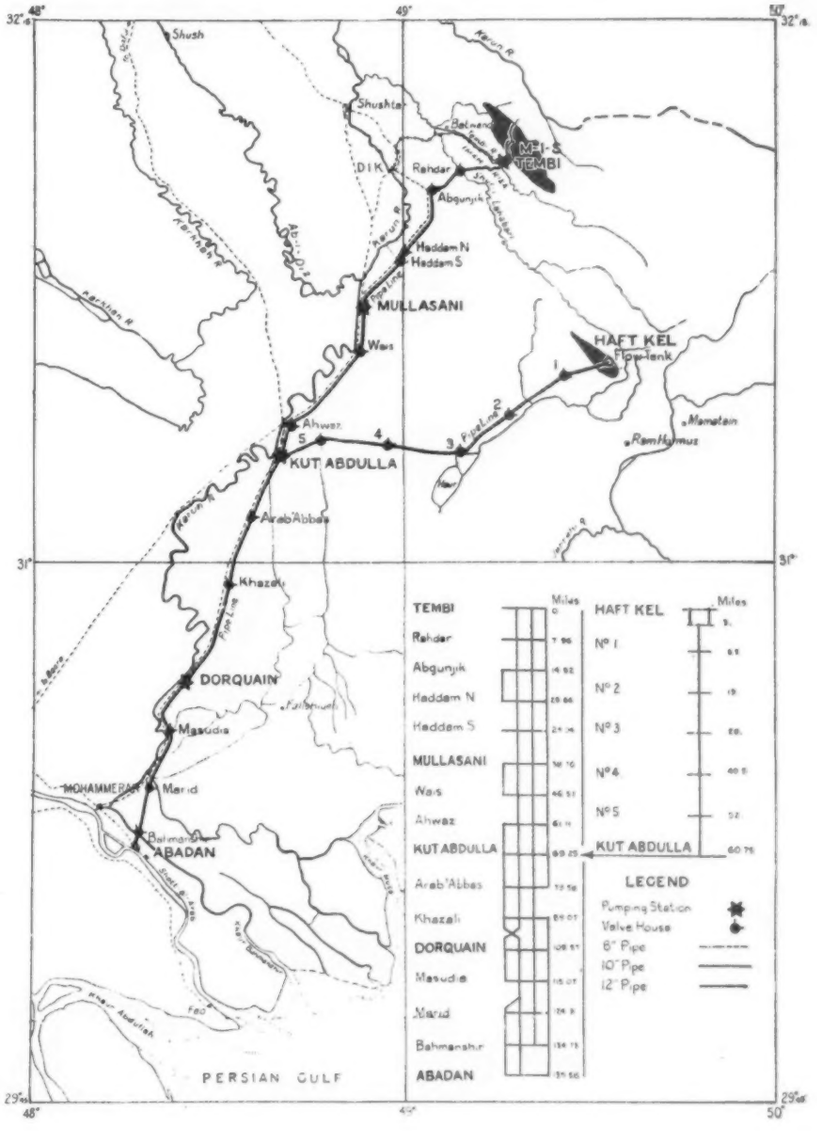
The Anglo-Persian's operations are centered, there is unity of action, and literal unity of geological fields, which by humor of nature turns out to be a unity of geological structure.

There are now oustanding 13,425,000 shares of ordinary (common) stock, of which 7,500,000 are owned by the British Government, and 2,861,990 by the Burmah Oil Company. The B. O. C. Anglo-Persian Share Trust owns 700,000 shares. There are about 2,000,000 shares floating in the market or held by individuals and companies. In 1929 a dividend of 20 per cent, less tax, was paid. Originally the British Government paid $25,000,000 for its holdings, which now have a market value of $147,500,000 even in the present depressed conditions in the oil share world. As total dividends received to date by the British authorities well exceed the purchase price, the investment has been very profitable as well as of stragetic or political value.

However, now that the Anglo-Persian's commercial position is virtually impregnable, its finances strong, and its management admirable it is time for the British Government to divest itself of its holdings and turn the organization control completely over to the industrial interests that have built up the Company's business. It will lessen the political tangles and irritations which are sure to arise when the neighboring oil fields of Iraq are opened up, and in which the Anglo-Persian concern has an interest jointly with great oil companies of other nations including the United States. It will be recalled that this point was discussed in WORLD PETROLEUM for February last.

The original concession obtained by D'Arcy in 1901 from the Shah of Persia was in conception as daring as D'Arcy was brilliant. It covered no less than five-sixths of the Persian Empire, the other sixth going into what became known in 1916 as the Khostaria concession located in the section of Persia granted to Russian interests by the agreement of St. Petersburg in 1907. It is interesting here to note that this concession was later cancelled by the Persian government at the suggestion of the Soviets as having been obtained under duress, which however did not prevent Anglo-Persian from buying from Mr. Khostaria his rights, whatever these may be, for the sum of 100,000 pounds sterling. Mr. Dowleh of the Persian Government explained in the LONDON TIMES (Dec. 26, 1921), that the concession was obtained "under coercion by the late Czarist Government and without the consent of the Medjhelis (Parliament)." Article No. 13 of the cancellation has caused untold

The two great oil fields of Persia are shown on this map, with the pipeline leading to the Abadan refinery.

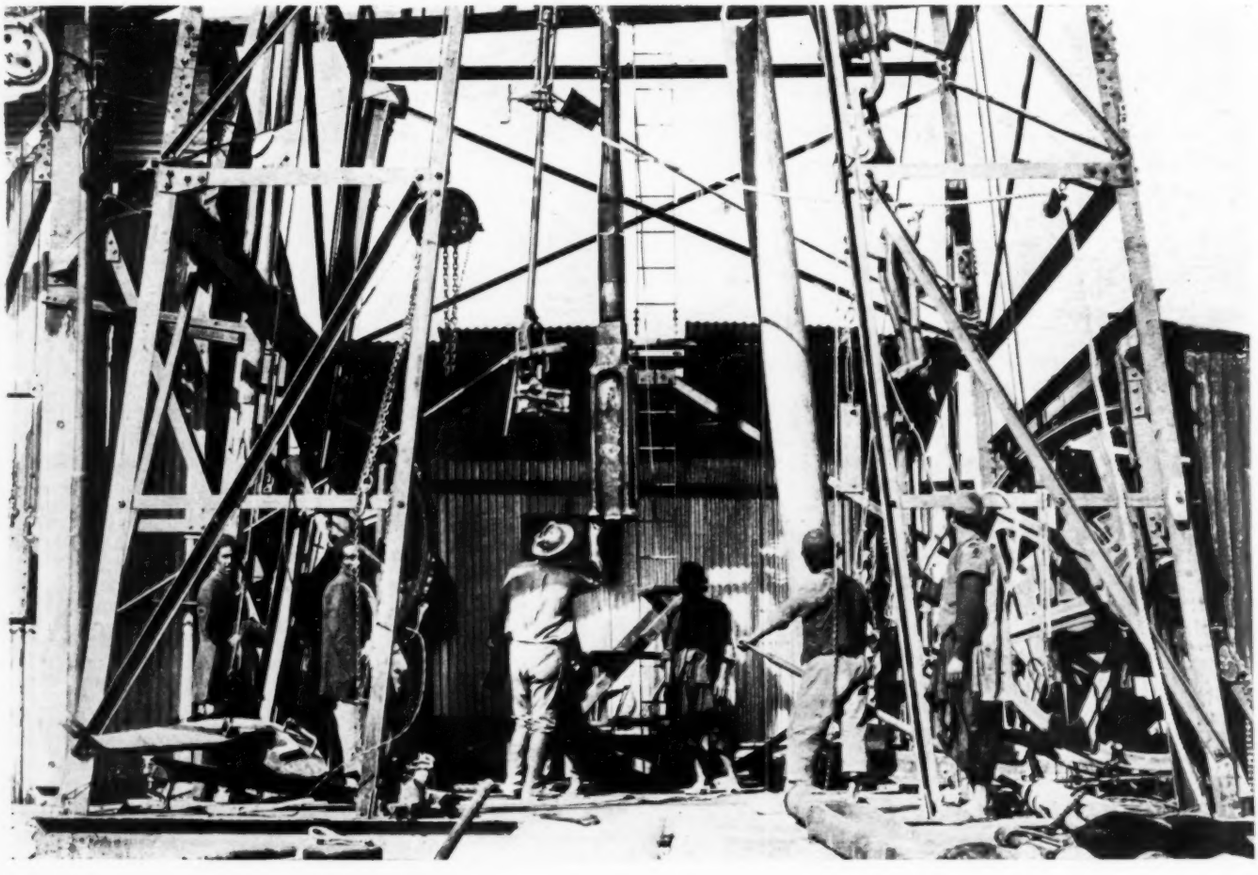


Rotary drilling is now being standardized by Anglo-Persian.

international trouble, for it states that the concession must not be transferred to foreign nationals without the consent of the Soviet government.

The property of Anglo-Persian actually under exploitation is far removed from the five northern provinces and is located at the head of the Persian Gulf, particularly around the Masjid-i-Sulaiman and Haft Kel fields. The first named is the original place where rock oil first became useful to mankind. Job, four thousand years ago, sang here of "the rock that poured me out rivers of oil." The Persian refinery of the company is located at Abadan, which is unquestionably the foremost oil center in the Mid East. From the field the company has run a pipe line to the seacoast covering 135 miles of pretty rough country, some of it rising to a height of 2,000 feet above sea-level. The oil at Masjid-i-Sulaiman is found at depths of from one to five thousand feet in wide sweeping synclines and anticlines.

Persian crude is of a high quality, having a specific gravity of 0.836 or about 37 deg. Beaume, and contains a large percentage of the more volatile hydrocarbons from which the highest grade motor spirit and other white oils are derived, the crude yielding a wide variety of by-products. The regularity of the geological structures of the field has been of great economic advantage to the company, and an ideal circumstance under which those observations and experiments indispensable to the scientific exploitation of oil have been carried out by Anglo-Persian. There are those who object to the use of the word "science"

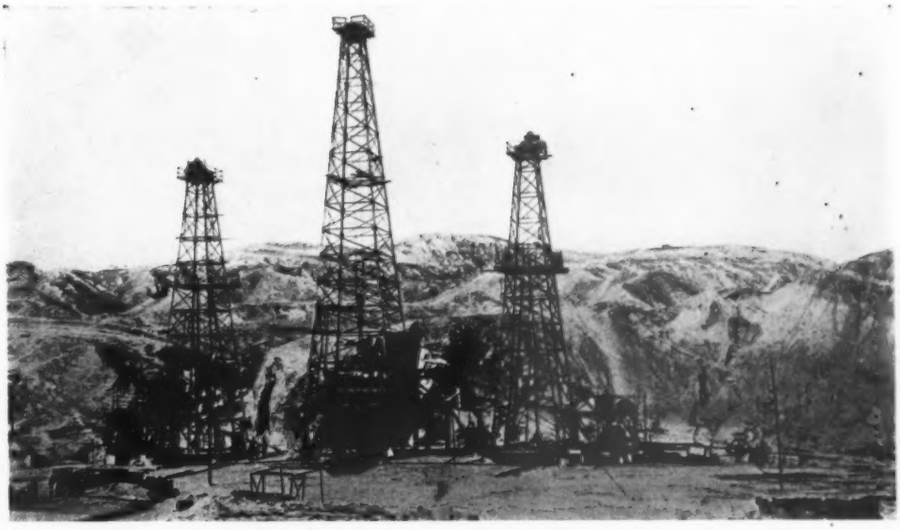


Cable rigs like this unit at Masjid-i-Suliman are gradually being superseded by rotaries.

in connection with geology, due no doubt to the uncertainty of geology, to its recent growth, and to the ridicule and under-estimation that geology in the past suffered at the hands of the oil press and oil operators in the United States. Science, we know, reveals order; but geology has revealed only disorder in that the exceptions are more numerous than the rules. Such, we understand, is the argument. On the other hand Anglo-Persian has not scrupled to pinning its faith on geological research. Among oil men generally Britishers are well known for that attachment to theoretical knowledge of physical conditions that geology inculcates, while in America oil men are apt to pin their faith on venture and results, hit or miss.

While most of the methods used by Anglo-Persian are well known in most oil countries, yet there are some features of the work that bring out distinctly the economic advantages of controlled production. In their geological work we first must note the extensive use of the Eotvos Torsion Balance, which shows the variations of gravitational force in different parts of a field; second, the minute measurement of electrical conductivity of sub-surface substances; third, the variations in magnetic susceptibility of these substances, and lastly, the variation of the compression waves of seismic phenomena as shown in the subsoil.

We note that Anglo-Persian has been using instruments of such an astounding delicacy as to measure 1/20 millionth of an inch. This is brought out because in the automobile industry we often real of measuring things up to the one ten-thousandth of an inch, which appears to be very inaccurate by comparison with the scientific work done at the British company's laboratory and research station in England. On the face of it, and without claiming to know anything about science, we suspect that some one some day is going to stumble upon a unified method and instrument of measurement; that is, a method whereby gravitation, electricity, and magnetism will have a common denominator in science, which will in turn result in some instrument able to measure interchangeably the variations in these three forces of nature, or as they may be called, these three manifestations of one underlying cause. Then geological research will be immeasurably simple and accurate.



The well in the central foreground is one of the most famous in Persia.

Until this basic principle is discovered, scientific research must suffer from the uncertainties of partial knowledge, and the vagaries of a revocable law. For instance, Anglo-Persian in using the electrical method studies "the shape of the current lines of electrical flow in a magnetic field" on the ground under investigation, even while great electrical engineers like Steinmetz very much doubted the most fundamental assumptions of British physicists, such as the "ether" which was literally "invented" by Faraday for his electromagnetic theory. Almost any physical scientist will say that these magnetic lines are purely hypothetical. In their magnetic experiments the company technicians base their deductions on the greater susceptibility of limestone to the magnetic force than that of other substances, limestone being the oil bearing structure. The immaturity of these methods is well stated in the words of J. W. Williamson, B. Sc., who has made a deep study of Anglo-Persian practice, and who says, "It is true that these different geological and geophysical investigations serve to confirm or rebut evidence inter se, but their main purpose, it should be noted, is to ascertain the limits of the various methods for elucidating geological sub-structure, so as to facilitate the selection of the method most appropriate to the peculiar conditions of the particular area under exploration."

Drilling work in Persia is conventional. They use the cable and rotary systems and in a few instances interchangeably when the holes had to be deepened. They have been able to drill as many as 450 feet per day with the

Persians are experts at dressing a drilling bit.

Standard rotary rig.

rotary system, experiencing the characteristic disadvantage of the rotary method in drilling crooked holes. Some of their holes have gone down 5,809 feet. The percussion system is gradually being changed to rotary throughout the fields. Production has been as follows:

NINETEEN YEARS PERSIAN OIL PRODUCTION

Year ended March 31st	Tons	Barrels
1912	43,084	301,588
1913	80,800	565,600
1914	273,635	1,915,445
1915	375,977	2,631,839
1916	449,394	3,145,758
1917	644,074	4,508,518
1918	897,402	6,281,814
1919	1,106,415	7,744,905
1920	1,385,301	9,697,107
1921	1,743,557	12,204,899
1922	2,327,221	16,290,547
1923	2,959,028	20,713,196
1924	3,714,216	25,999,512
1925	4,333,933	30,337,531
1926	4,556,157	31,893,099
1927	4,831,800	33,822,600
1928	5,357,800	37,504,600
1929	5,460,955	38,226,685
1930	5,060,419*	35,422,933*
Total	45,601,168	319,208,176

* Eleven months to November 30th.

OFFICIAL Persian production figures are given in tons. A standard conversion figure of seven barrels to the ton has been taken, but Persian crude is fairly light, so a basis of 0.725 bbl. would be more accurate. This total production has been from about 350 wells drilled to date, which number includes dry wells.

Another feature of their scientific work is petrography. The limestone is usually covered by a cap of anhydrite, with its peculiar radial structure as shown under the microscope. It is an easy matter for their petrologists to keep track of the location of the oil bearing strata by microscopic examination of the anhydrite, and the uniformity of this condition throughout the field has been a great help in the scientific work done by Anglo-Persian. No sooner is the anhydrite discovered than the usual precautions are taken for the control of the well.

Head offices at Abadan typify the spirit of the Company. E. H. O. Elkington is general manager in Persia.

Standard cable rig.

As a result, any one who visits a Persian oil field is amazed at the absence of any indication of oil, except for the natural seepages that are seen here and there. Compare this condition with those prevailing in Oklahoma or those that have prevailed in Tampico, Baku, and Roumania, and the indisputable value of scientific work and foresight is clearly evident, even while allowing for natural conditions which are beyond man's control. Not until one leaves the field and reaches the Abadan refinery 130 miles away, does one become aware of the presence of crude oil, which was being drawn from the Masjid-i-Sulaiman and Haft Kel fields at the rate of four million gallons daily. The Haft Kel field, by the way, is now in active production and bids fair to become as equally important as that at Solomon's Temple.

A carefully worked out system of pressure measurements is in force, the most important measurements being the "minimum closed" and the "dome gas" pressure, the difference of which de-

Anglo-Persian camp at foot of Mishun mountain.

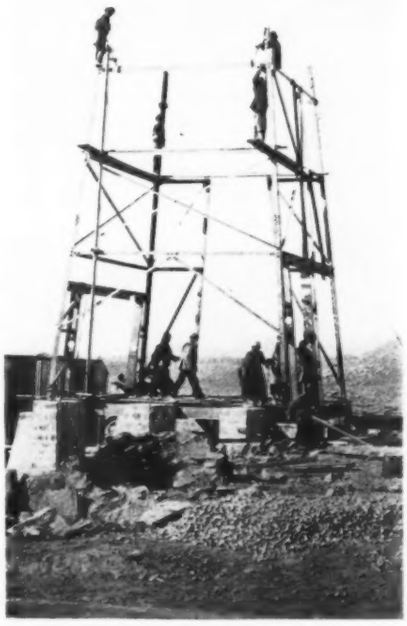
Extent of the Abadan refinery can be seen from this aerial view. It handles 100,000 bbl. of crude per day.

termines the gas-oil level. Through a system of graphs a clear picture is constantly kept before the mind of the gas-oil level underground, and by regulating the well production this level is kept uniform throughout the field. Again, because of the uniformity and lawfulness of the work, the oil in surrounding fields not in exploitation, where probably the gas-oil pressure is higher, is emigrating toward the exploited field thus producing a consequent richness, regularity, and consistency of output. Another feature of the work, which Anglo-Persian engineers claim to be peculiar to their labor, is the accurate information they keep on the oil-water level. Nowhere in the world, they say, has such excellent scientific work been done on sub-surface pressures and this they attribute to the advantage of unified control.

Anglo-Persian engineers have proceeded in the same methodical, broad-visioned manner to solve their gas problem. The normal pressure is 150 pounds to the square inch, which is successively reduced by means of "separators" to 30 pounds to the inch. They obtain an average of 3,000 bbl. of motor spirit daily from the 45,000,000 cubic feet of gas. They also have heat "interchangers" to use the heat taken from one oil to heat up another. Through cracking and common refinery methods they produce the usual long list of by-products. The ratio of waste between oil and gas being one to six, for every part of oil produced, six parts are blown off into the infinite.

Some of the gas has been returned to the ground along with oil after tapping. "In this connection," says Mr. Williamson, "mention may be made of an analogous operation already adapted, namely, the reinjecting of fuel oil, which

Below,—Persian labor erecting a drilling jig.

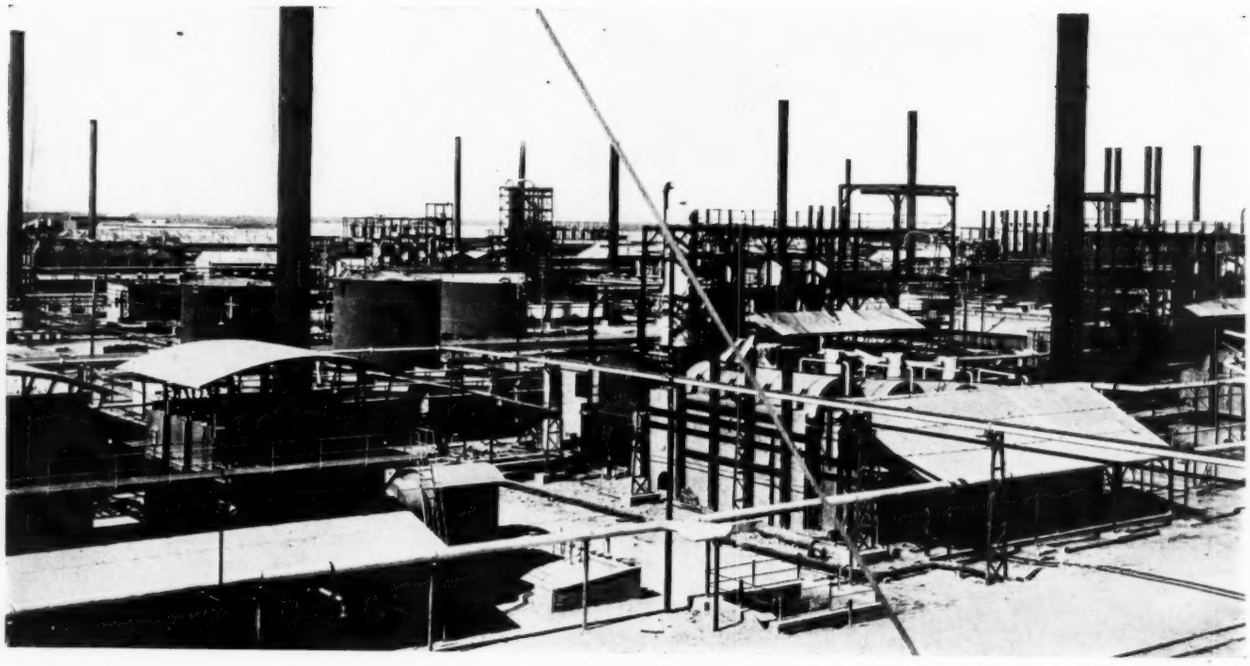


Below,—Anglo-Persian's tanker fleet totals 1,000,000 tons deadweight. Tankers at Abadan refinery.

is surplus to local market requirements and to those of neighboring countries into the oil reservoir, after having saturated it with gas at reservoir pressure. The reason for this last precaution is that, if the fuel oil were returned to the reservoir without its full gas content at reservoir pressures, it would of course absorb gas from the crude oil, and so by reducing the gas pressure in course of time reduce the flowing lives of the wells." Again, some of the gas is pumped into the pipe line, and in this way carried along with the crude to the Abadan refinery for use.

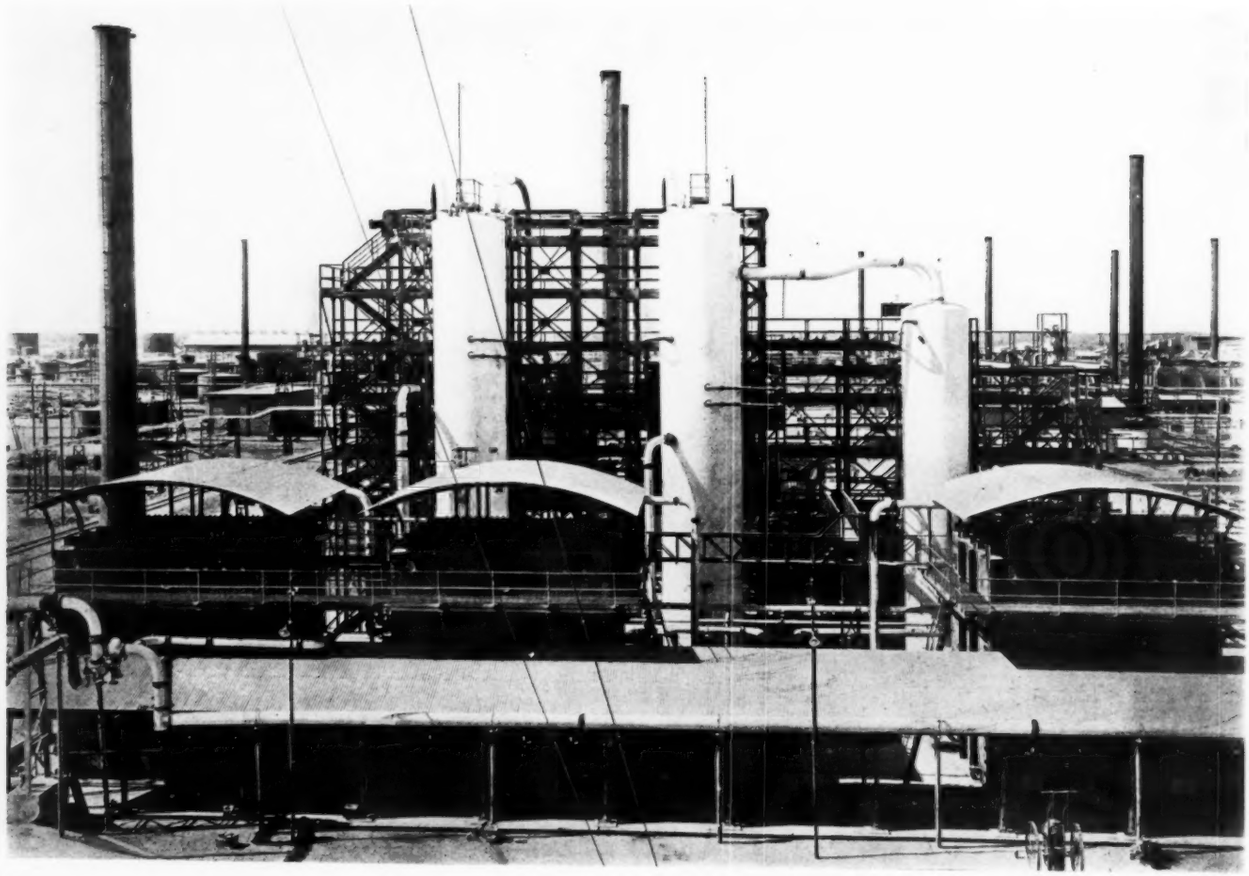
The Bibian laboratory established in 1926 possesses the latest apparatus and conveniences that the oil industry knows. Their pipe line runs from Tembi to Abadan with pumping stations every 35 miles. It was noticed that corrosion of the pipe caused a great deal of damage, and with their usual ingenuity the cause was finally located. As everyone knows, the desert sand contains a large amount of salt, which causes the corrosion. A method has been devised for washing off the salt from the sand around the pipe, especially in high places where the damage is the worst. Another device for preserving the life of the pipes was to run a third pipe alongside the two main pipes in such places where the pressure was abnormal, thus maintaining a uniform pressure in the entire circulation system.

Immediately upon arriving at the refinery the oil is "degassed." Each distillation unit handles 24,000 bbl. daily. Motor spirit and kerosene are deodorized by what is called the "counter current method." On account of the extreme heat of the climate, sometimes



Above—Batches of stills at the great Abadan refinery.

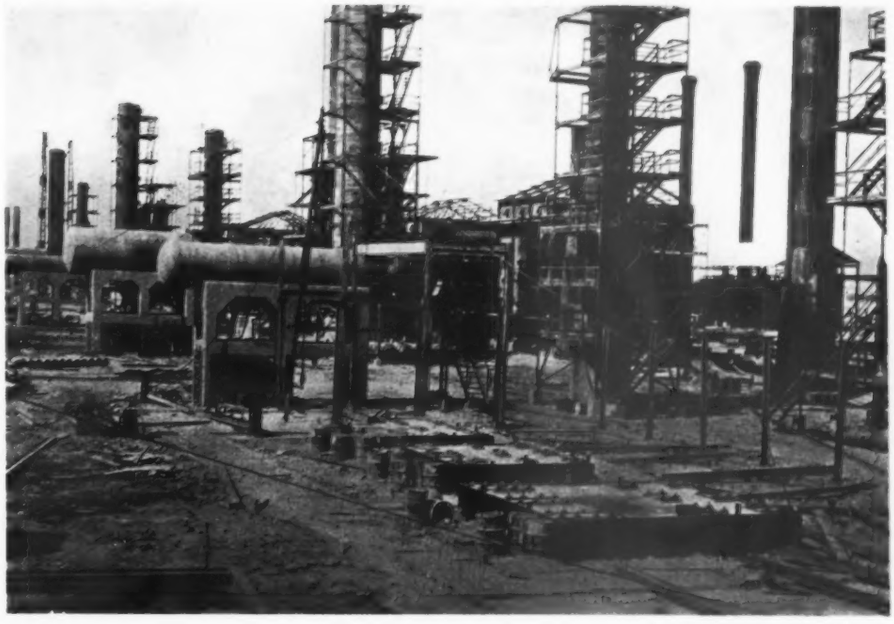
Below—Until now topping has been the function at Abadan.



as high as 126 degree F., in the shade, it was early found that evaporation takes a heavy toll of tankage oil, with the ordinary circular tank helping the process. Therefore, the company engineers adopted what is called the "floating roof" tank, developed in the United States and thus have reduced vaporization losses to a large extent.

The Anglo-Persian has originated a special hypochlorite treatment, which has the singular advantage that it does not destroy, as happens in so many other refineries where different treatments are used, those highly valuable constituents of motor spirits and other distillates which give great efficiency to the finished petrol.

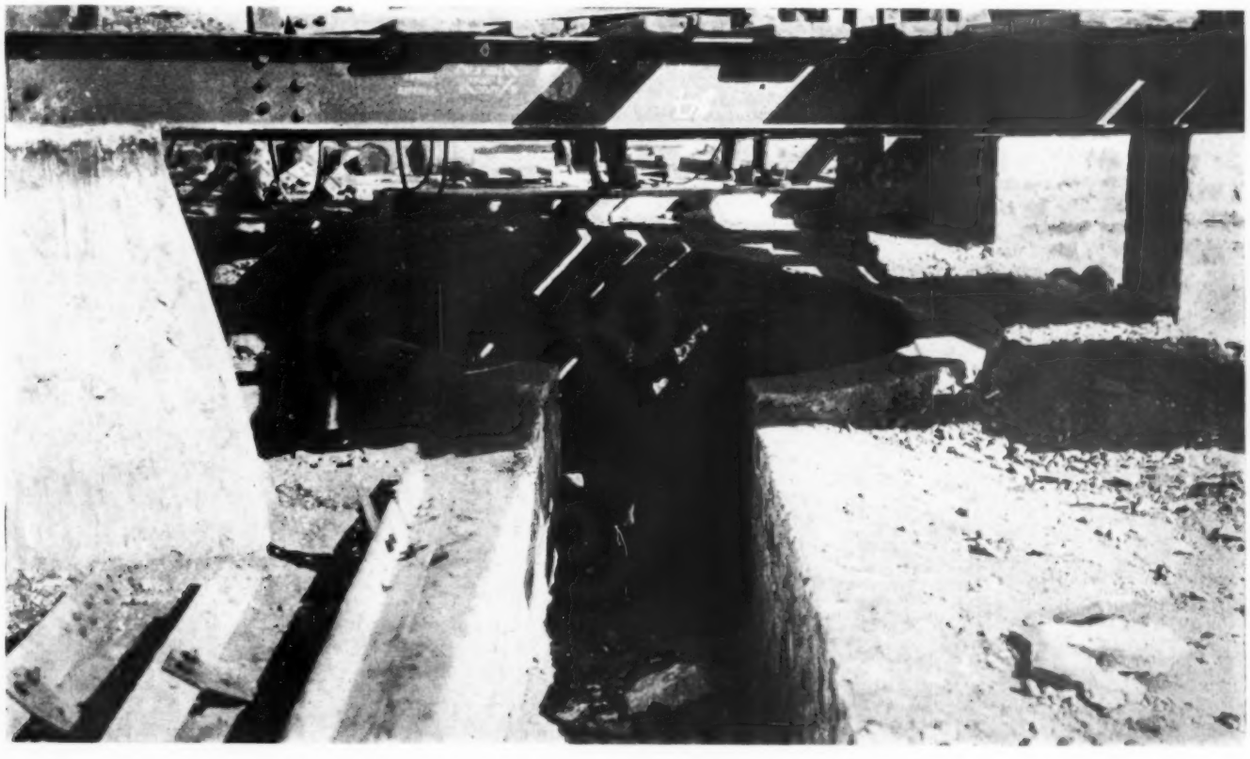
There is a well equipped research laboratory at Sunbury-on-Thames, England. Here was produced the special oil for Sir Henry Segrave's car that developed a world record speed of 231 miles an hour. Much scientific work is carried out at Sunbury, but information as to investigations is never published before the results have been proved beyond all possibility of error. As is customary in the oil industry any device or invention of general interest or application is then patented and made available to others on reasonable royalty terms which are computed to balance the cost of the investigation rather than to secure "profit."



New Cross cracking units are practically completed at the Anglo-Persian's Abadan refinery.

The Llandarcy refinery of the company in South Wales was opened in 1922, and is operated on the most advanced ideas of the oil refining industry. It has a tank farm of sixty tanks with a capacity of about 4,000,000 barrels.

Sir John Cadman has for many years advocated oil conservation. In these days all great oil leaders are conservationists. Nevertheless, it is a poor commentary on the economic resourcefulness of modern business leadership that restriction alone seems to occur to business leaders when they have to face the so-called problem of overproduction. This has been a problem with the industry from its inception, and restriction has



Cellar of Persian oil well being prepared for drilling.

Road service station at Abadan.

Persian boys drilling at the Company school.

Top of Braun cooling tower in the field.

failed to solve it. In a world suffering from underconsumption rather, no one has yet thought of any other practical and acceptable method for the present situation than the old, old story of restriction. As has been cynically said, show me that a thing pays, and I will show you plenty of ethical arguments why it should be done.

Anglo-Persian has been an unquestioned blessing to the Persian nation in default of Persian capital to develop their resources. They have built 1,600 miles of good roads; they are employing 30,000 Persians in this work; they have 86 tankers in the service; they have built a powerful radio station at Abadan, and during the past 15 years they have paid into the national treasury 40,000,000 pounds sterling, thus relieving the nation of a very substantial burden of taxation and enriching the national wealth fourfold, if it be true that an untaxed pound produces four others in the course of a few years. The company employs 1,000 Europeans—mostly British—in its Persian operations, who have brought to Persia the ideas and ideals of Europe, raised by example the standard of living among the Persian people, have made them acquainted with modern methods of education, sport, business, industry, and the humanities of industry. The ancient dictum of Dollfus, "the master owes something to the worker beyond his mere wages," has been accepted by the company and exemplified in the educational work among the Persian population, a work extending from the establishment of public primary schools to the granting of valuable scholarships at Birmingham University. His Majesty, Shah Reza Pahlavi is a warm supporter of the Persian oil industry as carried out by the British organization.

Thus we can conclude this review by saying that the rich seed sown by William K. D'Arcy has bloomed into abundant fruit in the capable hands of Sir John Cadman and his far-sighted associates in the field of science. It is the reasonable hope of every international oil man that this valuable substance—oil—will henceforth be used solely for the industrial advancement and economic betterment of mankind. "He who owns the oil," said Henry Berenger, "will own the world, for he will rule the sea by means of heavy oils, the air by means of ultra refined oils, and the land by means of motor spirit and the illuminating oils. And in addition to these he will rule his fellowmen in an economic sense, by reason of the fantastic wealth he will derive from oil.

On December 12, 1930, the mandate commission of the League of Nations finished its study of the international oil problem in Mesopotamia, in which Anglo-Persian is deeply interested, as it also owns and operates concessions in the adjoining country of Iraq. The report and minutes of the commission will be made public on January 19, 1931, and these certainly ought to throw much light on international oil competition. It behooves those statesmen of the day, who have taken a special interest in the oil industry on account of its power for good or evil, like Winston Churchill, Henry Berenger, and Andrew Mellon, to see to it that the oil resources be used for the service of and understanding among men and for that world harmony which the very nature of petroleum ought to symbolize.

J. POINTER.

Crystallizing Opinion for Constructive Action

Formation and Adoption of Remedial Measures Permitting a Better Correlation of Underground Property Rights Necessary For Protection of Oil Land Owners' Coequal Rights. . . .

DURING 1929 all previous records were surpassed in the production of crude petroleum and natural gasoline, in the domestic demand for petroleum products, and in the quantities of oil held in storage. Production of crude petroleum in the United States amounted to 1,006,000,000 barrels, representing a 12 per cent increase over 1928; 1929 was the first year in which production reached the billion mark. Crude oil production in countries other than the United States reached a total of 482,604,000 barrels, or 58,344,000 barrels more than in 1928. The rate of increase in domestic production did not quite equal that of foreign oil-producing countries; consequently, the share of the United States production in the world total dropped from 68 per cent in 1928 to 67.6 per cent in 1929.

The refining branch of the industry was not far behind the crude oil producers in record-breaking achievements; it established a new high mark of 987,708,000 barrels of crude oil run to the stills, an increase of 8 per cent over 1928. The indicated domestic demand for all refined products showed a gain of 9 per cent over the previous year, and the consumption of gasoline in the United States was 13 per cent greater than in 1928 and exceeded expectations in this respect. Any benefits to producers which might have accrued from gain in domestic demand were, however, more than offset by the increase in the available supply of raw materials—crude petroleum and natural gasoline. Stocks of both crude petroleum and refined products increased materially, and during one month only (November) was there any reduction of the total stocks of all oils. . . . .

Domestic Consumption and Exports

The direct demand for petroleum products is expressed through purchase intended for use within the country and through purchases intended for shipment and use abroad. One is domestic demand; the other is foreign demand.

The net result is that, on the one hand, there is the daily production of crude petroleum and natural gasoline—raw materials which fill the needs of the refiner—and, on the other hand, there is the daily composite demand for refinery products. It is the function of the refiner, or manufacturer of petroleum products, to gage this composite demand, as applied to his own marketing territory and, through his interpretation, to be guided in his commitments for the purchase of crude oil.

When the refiners' crude oil purchases are properly coordinated and when the composite public demand for refined products has been correctly interpreted, the crude oil requirements would be equivalent to total domestic and foreign demand. Under conditions of crude oil supply available at low prices, however, the refiner may increase his crude oil throughout and, concurrently, his output of refined products in excess of the public demand. . . . .

The domestic demand for all oils increased 79,000,000 barrels, or 9 per cent, in 1929. This should be regarded as a satisfactory rate of growth; but, for the petroleum industry in 1929, it was more than offset by an increase in crude production of 115,000,000 barrels.

The difference was reflected principally in stocks, which increased 68,000,000 barrels in 1929, as compared with only 23,000,000 barrels in 1928.

Great Increase in Petroleum Stocks

Stocks of all oils have grown rapidly in recent years so that, on December 31, 1929, they amounted to a total of 682,000,000 barrels. Not only does this constitute nearly eight months' supply, but during the early months of 1930 the rate of production continued to add to these quantities. In addition to these quantities of oil held in storage above ground, there are controlled wells which have been estimated as capable, if opened to capacity, of increasing present production by one, or even three million barrels daily. On the basis of this available supply of oil and recognizing that methods of procuring and extracting oil have progressed to a point where increased demand through seasonal influences or otherwise may be quickly met, many refiners have adopted the policy of restricting to bare working stocks the quantities of oil held in storage, in contrast with the former policy of storing quantities of oil in anticipation of an expected shortage. This

ONE can with much profit turn back at this time the pages of the records of oil history seven months when the Federal Oil Conservation Board issued its Fourth report to the President of the United States. At that date the cumulative conditions, which have since produced the critical state now existing, were beginning to make themselves very apparent. In this report the Board in very clear terms outlined the unsound situation and pointed the way to a decided improvement. Time has passed and the industry with its eyes open to the remedies is still a long way from normalization. Now is the moment for the report of last summer to be re-read, and for the facility of the busy oil man World Petroleum has extracted the outstanding comments and proposals.

policy is safe and results in large savings in the carrying cost of unneeded storage. . . . .

Taken alone, statistics of crude oil production and imports, which make up supply, have little significance since, as stated before, the other or demand side of the balance sheet appears for the most part in refined products, whether for domestic consumption or export. In this manner only can the complete picture of supply and demand in the petroleum industry be presented. The surplus output of our refineries is exported; in 1929 these exports included gasoline in an amount equal to 14 per cent of our total output; kerosene, 34 per cent; and lubricants, 32 per cent. These exports of refinery products were valued at over one-half a billion dollars and constituted the third largest item in the foreign trade of the United States.

Effect of Loss of Foreign Trade

A supply and demand table based on crude-oil figures alone would show as domestic demand the requirements of the domestic refineries; but, if our foreign trade in refined products were to cease entirely, the refinery demand for crude would have to fall at least an amount representing the exports of gasoline, and there would still be an embarrassing overproduction of kerosene, lubricating oil, and wax. In other words, between 10 and 15 per cent of the crude produced and run to refineries is represented on the consumption side of the balance sheet by refined products for foreign markets. To that extent the consumption of crude oil by domestic refineries represents other than "domestic demand". . . . .

Since 1922, total exports for each year have exceeded total imports; and in none of the last 5 years have imports of crude reached 9 per cent of domestic production. These relations demonstrate the fact of overproduction of crude oil in the United States in 1929, as in most other recent years.

Revising Views Regarding Oil Reserves

The discovery of new fields and of deeper sands in old fields makes necessary some revision of our ideas regarding the supply of oil available to meet future demands. . . . .

The geologist, with the aid of the production engineer, seems to have proved his own estimates wrong. However, as pointed out in the first report of the Federal Oil Conservation Board, oil is an irreplaceable natural product and the oil resources of the country are limited. Increased production is not an index of the remaining resources, but a record of depletion and a warning of impaired reserves. To provide for the common defense and promote the general welfare the Government and industry must cooperate to protect the newly discovered oil reserves and those previously known from dangerous and too rapid depletion. . . . .

Drilling Technique Advance

Deep drilling has resulted in the discovery of prolific horizons at depths which a few years ago were unattainable. Then the drilling of a well to a depth of 5.000 feet was considered an outstanding accomplishment, fraught with extreme difficulty and hazard; today most of the problems involved in reaching a depth of 10,000 feet have been solved. . . . .

The improvement in operating technique is constantly increasing the percentage of recovery of oil from the sand and a new interest has developed in some of the older oil fields, from which appreciable supplies of oil are now being recovered as a result of rejuvenation. This means harvesting a second crop of oil, and in the Bradford and Allegheny fields of Pennsylvania alone new methods are estimated to have added 600,000,000 barrels to the ultimate recoverable supply.

Better technique in drilling and completing wells, the rational development of pools without competitive drilling, the maintenance of gas pressure in the new fields, and the restoration of pressure in partly depleted fields are all factors of outstanding importance in increasing the total production of crude oil from the natural reservoirs of this country. This increase in ultimate recovery from fields in excess of the original estimates—which in specific terms referred to the oil "recoverable by the production methods then in use" —together with the discovery of deep prolific sands and new fields, explains the inconsistencies between previously estimated reserves and the enormous quantity of oil produced subsequent to the making of such estimates.

Revised Estimates Do Not Increase Future Supply

Such revision of estimates does not increase the actual future supply. Expressing these estimates of reserve in years, moreover, introduces into the equation another unknown factor, the rate of consumption, which has not lagged far behind the almost incredible increases in the rate of production. Yet what the consuming public asks is: How long can supply keep pace with demand?

At present the large margin of safety between domestic demand and supply calls for a considerable degree of restraint in producing from newly discovered fields and sands. Never before has there been so large a shut-in production. Many well-informed men in the industry believe that if all the wells of California, Texas, and Oklahoma were opened to full capacity the present daily output, large as it is, might be temporarily doubled. This potential production of oil wisely held in underground storage represents a quick asset that will be immediately available when needed.

The purpose of the several conservation measures urged by the Federal Oil Conservation Board is primarily to delay the coming of the day when an impending shortage of crude oil will cause a radical advance in the prices of the refinery products the public buys. It matters not whether the oil reserves of the United States are five times a billion barrels or twenty times a billion barrels, the supply is limited and can not be increased. Even the most generous estimates place the date at which our oil reserves will be practically depleted, under present rates of consumption, in the comparatively near future. In the interest of national defense and industrial prosperity this generation should not be permitted to waste this irreplaceable natural product and thus seriously handicap future generations of Americans. . . . .

Progress in Unit Operation

In his letter dated December 19, 1924, constituting the Federal Oil Conservation Board, President Coolidge laid emphasis on the impossibility of conserving "oil in the ground under our present leasing and royalty practices if a neighboring owner or lessee desires to gain possession of his deposits," and urged "that Government and business can well join forces to work out this problem of practical conservation," that can not be solved by "the simple working of the law of supply and demand."

In its first report, dated September 6, 1926, the Board stressed the responsibility that rests upon the oil industry in adopting measures to protect our future supplies, and urged the ac-

ceptance of "cooperative methods in sane development of new fields to prevent wasteful flush flow and overproduction." The test of experience was applied to the voluntary agreement plan of pool development and operation by citing actual instances where conservation and economy had been promoted with much success thereby. Nearly four years have elapsed since the publication of the Board's first report, and much progress has since been made by the industry along the lines of control of the flush flow. There is much more to be accomplished, however, and the Board desires to direct its further efforts at this time along lines that will be helpful in stimulating discussion and in accelerating the crystallization of opinion both in and out of the oil industry that will lead to constructive action and will receive general approval. even though in so doing the Board may be accused of taking a step in advance of the times and one that is too difficult of accomplishment.

Monopolistic Control Scare

Of the various cooperative methods that have been discussed and have been tried out, the unit-operation plan seems by common consent to have commended itself more than any other.

Mere mention of united action or cooperative effort suggests to many the idea of monopolistic control. An engineering plan to lower production costs is thought to be the first move in a conspiracy to raise market prices. An effort to reduce waste and conserve supply is interpreted as a scheme to corner the market. . . . .

Community action in the handling of what is by right the common property in an oil pool is not different in effect from the operation of a field under single ownership where an economical drilling program is adopted with the definite purpose of high recovery at low cost and at a rate adjusted to market demand.

Overproduction of any commodity is uneconomic, and if it involves depletion of a supply that can not be replaced, overproduction and the consequent wastefulness effect a permanent injury. Especially is overproduction in the oil business a public menace, by reason of the unnatural and unfair competition between co-owners within the same natural unit. It is this individualistic strife, characterized by haste and waste, that has been a large factor in inciting overproduction in the past.

The change from the delirium of competitive operation of a pool to the sanity of cooperation need not involve any danger that underproduction will be substituted for excess production; going to that improbable extreme can be avoided by the exercise of the police power of the State, as long as there are in the ground reserves of oil large enough to meet an increasing demand. The inevitable day of deficit in supply, with attendant high prices, will be postponed by simply stopping the present type of unnatural warfare, politely termed competition, between neighbors in the same pool. . . . .

The unit idea in producing oil is bound to win out, because the natural unit is the oil pool. Man may draw property lines on the surface, making a checkerboard for title searchers and lease lawyers to play on, but nature has fixed a boundary line around the underground deposit for geologists to discover and engineers to use in the development of the hidden resource. . . . .

Fences, walls, and other land lines serve effectively as property boundaries where the property is fixed in character and position, whether it is valuable as tillable soil or as a structural foundation. These same lines may be extended downward as vertical planes and serve no less acceptably to define property rights in the ores we mine. The essential part of the property-line idea is our faith in the continuing relation of the line to the fixed property. It serves best of all when by triangulation we tie our private land corners to the geodetic constants; then the hand of man can not erase beyond recovery the boundaries of our estate. Quite different, however, is the relation of any land lines to property rights in the winds that blow and the waters that flow across these man-marked boundaries.

Oil and Rights of Neighbors

The mobile and fugitive nature of air and water makes our rights to their possession and use related to the rights of our neighbors, so that some coordination is required, lest the use by one interfere with that by others.

All this is recognized in the common law and is so obvious that it seems strange that a different mode of thought and jurisprudence has prevailed regarding the oil and gas beneath the surface. . . . .

Once a beginning is made in bringing the oil to the surface and thus giving value to the underground resource, the oil beneath the surface becomes movable property and the only boundaries to be considered are the exterior limits of the pool. Thereupon the division of the oil property between surface owners is no longer fixed—hence the "ferae naturae" figure of speech of the lawyers. But anyone who sees the oil pool as a natural unit with divided ownership might reasonably ask—why not adopt a procedure that will preserve rather than destroy pre-existing property rights? Why sanction practices and formulate rules that lead directly to a contest for possession among the owners, each trying to get more than his share of the whole property? By reason of its loss of fixed character, why should not the oil be regarded as taking on the nature of common property? At least this would be substituting equity for war, business in the open for underground robbery. . . . .

Remedial Measures Urged

Treating an oil pool as a unit is now generally indorsed by the production engineers who have studied the physics of the oil and gas in their underground association. The method meets the real test of efficiency by lowering costs of development and operation and increasing the percentage of recovery of oil. The difficulty in putting the plan into effect lies in the large advantage that a single owner of a small surface holding may now seize for himself under the rules of the game as at present supported by well-aged judicial opinion. Repeatedly, proposals for agreements between property owners to promote the efficient and economical handling of their common property, in protection of their mutual rights, have been vetoed by a small minority of the parties in interest. For these reasons, the Federal Oil Conservation Board early urged "the formulation and adoption of remedial measures permitting a better correlation of underground property rights."

Some affirmative action by either court or legislature, whereby the coequal rights of all the owners may be recognized and protected, is sorely needed, and this regulatory action may well be predicated on the magnitude and gravity of the public interest involved. The principle of justice between owners would seem to be incentive enough, but if more grounds for action are required, good technology and good economics amply justify the acceptance of unit operation as in the public interest. . . . .

Justice to all owners and benefit to the public can both result from this observance of natural and economic law in recognizing the oil pool as the natural unit.

Roumania's Critical Production Condition

New Restriction Policy Imperative to Replace Crude-oil Curtailment Agreement Broken-up Through Withdrawal of the Steaua Romana.

By E. A. Margulius

IMPROVEMENTS in drilling methods, and the discovery of the very prolific Meotic sands on the Southern flank of the Moreni salt dome last year led to a very intensive drilling activity in Roumania. The Moreni Meotic wells, giving a steady daily production of between 15 to 45 tank car loads of about 70 bbl. each, have increased the production of our country much beyond the possibility of handling its production. The pumping and storage capacity, though ample in 1929, proved utterly inadequate in 1930.

By June last, most companies with all their tanks full, had to bean down their flowing wells and stop most of the bailing wells, and those under airlift were shut down altogether. Prices of crude collapsed. Bustenari crude, the highest grade oil in Roumania, dropped from 22,000 lei to less than 10,000 lei per car. The position seemed desperate for most producers, when the two great Dutch-British and American companies, the Astra-Romana and the Romano-Americana took the initiative to put an end to that chaotic state of things. Their step was, probably, more in the nature of a police action to stop the deteriorating influence of an unrestricted production in the hands of people already on the verge of panic.

These two companies proposed reducing the daily production of Roumania by 400 tank cars, i. e. to 1,350 tank cars, as from the 21st July to the 30th November, 1930. Though the Roumanian companies were not allowed to discuss any single detail of the proposed agreement, they enthusiastically and almost unanimously (98.7%) adopted it. The repartition of the quantity between the various companies was based on the relative production of the various companies during the months of April-June, 1930.

As a basis for the repartition for the second period between October and March, 1931, results of a test of potentiality made on September 12th were adopted. The daily potential production ascertained at that date was of about 3,200 tank cars, i. e. an increase of nearly 100% over the "over production" of less than three months before. This increase, as far as it represented real figures, was due to the desire of every company to get the biggest possible quota in the restricted production, and to the policy of intensive drilling which they adopted as a consequence.

The result of the test was a complete surprise to most concerns, who hinted, rightly or wrongly, at unfairness in methods and results.

One of the principal companies dissatisfied with the results of the test, and with its prospects for the following six months, was the Steaua Romana. This company, for a long time the biggest producer in Roumania, became now by the test the fourth company in the country.

In October the Steaua Romana concluded some big contracts abroad, especially in Spain, for the sale of products. These contracts, by their magnitude could, apparently, not have been carried out with Steaua Romana's restricted production. This fact, coupled with the company's dissatisfaction at the economic results of the restriction (no increase in the prices of products as

In the Campina field, Roumania, derricks are nearly as thick as they are in California.

hoped for), made the Steaua Romana adopt an unexpected attitude. On the 24th October, it sent an intimation to the Producers' Association to the effect that, as from the 1st December they intended to withdraw from the restriction agreement. They expressed, however, their keenness to adhere to some new and fairer restriction scheme, provided it would ensure them a place more in harmony with their normal production and drilling activity.

As an immediate consequence of Steaua Romana's notification, the two initiators of the scheme, themselves, withdrew from the convention. At a general meeting the Producers Association unanimously undertook, however, to continue enforcing the restriction until the 1st December in the hope that, in the meantime, some scheme would be devised to reestablish the situation. A permanent committee was appointed from amongst the producers for that purpose, but unhappily it met with no success whatever in spite of the dilligence of some of its members.

In the meantime, though crude for prompt delivery was practically unobtainable on the market, prices started to decline rapidly and collapsed to the level of the previous crisis. Bustenari crude, which since August had risen again to 16,500 lei per car, dropped to 8,500 lei.

At subsequent meetings of the association, everybody seemed extremely anxious to have the restriction agreement reestablished. A deadlock was caused, however, by the different views as to the quantity of crude which Roumania was to be allowed to produce. Several big companies, headed by the Steaua Romana, demanded that this figure should be increased from 1,350 to 1,600-1,750 cars per day production.

Derricks on the hill and tanks in the valley. Bordeni oilfield, district of Prahova, Roumania.

The Astra Romana and the Romano Americana companies failed to see any justification for an increase in Roumania's quota, as already the 1,350 cars represented 10% over the 1929 production, while the restriction scheme enforced abroad (except in Russia) was based on a figure 5½% less than the 1929 production. There was, besides, according to them, no possibility of extending the market for Roumanian products now that Russian competition was at its height.

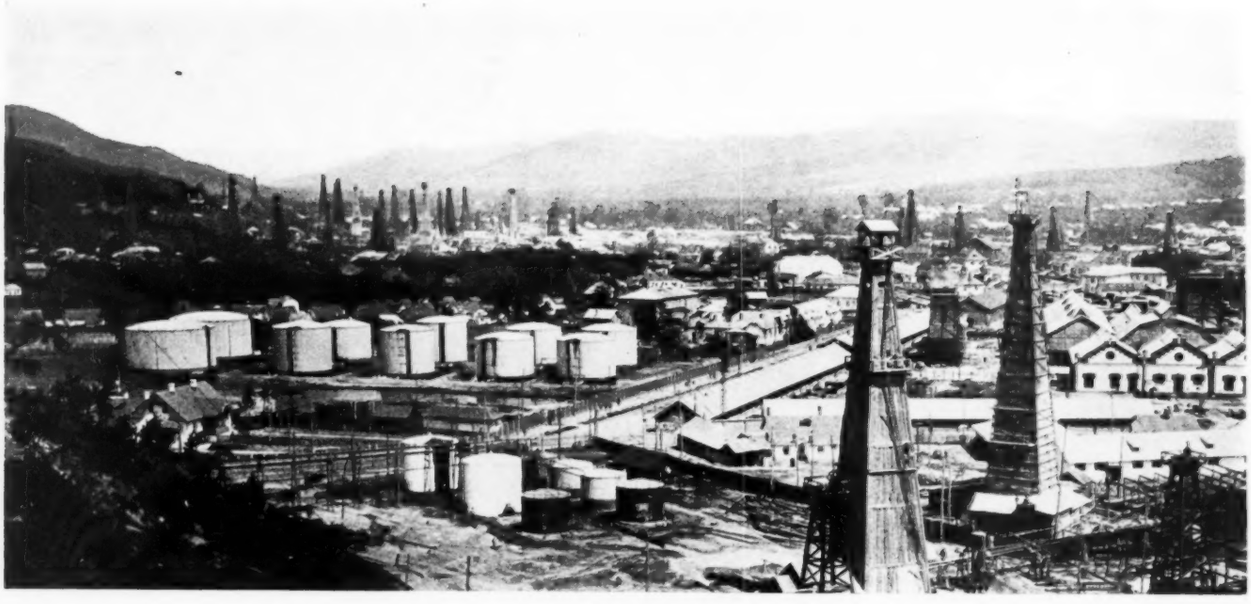
The association also expressed a strong desire that an extension of the expired agreement for another period of 1 to 3 months at least, should be adopted so as to render the possibility of devising a new scheme before the chaos set in.

As the Steaua Romana emphatically insisted upon the requested increase in Roumania's quota being applied even to this extension of the agreement, and as the Astra Romana bluntly rejected this suggestion the deadlock persisted. In consequence, as from the 1st December, the agreement lapsed, giving the companies full liberty to produce to their utmost capacity.

It is very significant, however, that though free to do it, practically all the big companies have until now only increased very slightly their production. The general belief is that some restriction will be tacitly enforced and that the total daily production of Roumania will not, for some time at least, exceed 1,800 tank cars per day.

Everybody is convinced that a restric-

Bustenari field, Roumania.



Moreni oilfield, Roumania.

tion policy is imperative, and that some compromise has to be found to smooth the existing difficulties. Should the attempts to achieve a new convention fail, the effects would be those predicted by the unanimity of producers, i. e. chaos and utter ruin for the great majority of Roumanian producers. These forecasts were bluntly stated by the Astra Romana's board in their memorandum presented to the Producers Association. They went so far as to maintain that an unrestricted production in Roumania would cause the breaking down of the International Limitation Agreement, a terrific competition, and a consequent fall of prices to zero.

Negotiations are now being carried on in London and Paris and a fair amount of optimism is evident in well informed circles. The proposal of the producers' committee for a new restriction agreement is based on a new repartition of quotas fixed for a longer period of time (1 year), and in proportion with the companies' production for 1929 (or June 1929-June 1930). The test of potentiality (the main cause of the present troubles) will be taken, if at all, simply as a corrective for the 1929 figures. It has also been suggested that drilling should be limited to 2 metres per tank car load produced.

Personally I believe that one has every reason to predict that during the next five or six weeks the "Convention of Conservation" will again be a reality, and thus the ruin of all but eight or nine Roumanian petroleum companies will be averted.

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Roumanian Crude Curtailment Essential

Board of the Astra-Romana Forsee Great Struggle in World's Oil Markets Followed By Disaster to Many Roumanian Companies Unless Restrictions Are Immediately Renewed . . .

THE Board of the "Astra-Romana" Company at their meeting held in Paris on November 25th, 1930 came to the following conclusions:

1.—The Roumanian conservation agreement enforced on July 21st, 1930 which has, in the meantime, been abandoned as from November 30th, 1930, has given possibility to the production of crude of Roumania to exceed that of 1929 by about 10 per cent.

2.—All the other producing countries with the exception of Russia have reduced their production for 1930 by about 5½ per cent as compared to their production of 1929, which represents about 11 million tons less than the production for 1929. The United States and the South American countries have also decided to enforce a new and still bigger reduction as from December 1st, 1930. All this reduction has been obtained by closing down existing wells, and even wells recently brought into production, and this restriction can be lifted at any moment by opening those wells.

3.—In July, 1930, the producers representing about 98 per cent of the total production of Roumania have accepted a conservation scheme proposed by the

"Astra-Romana" and "Romano-Americana" companies, which scheme was accompanied by an offer for the purchase of large quantities of Roumanian oil products. Until now the convention has generally given satisfactory results. Although, owing to the world crisis, this convention could not bring about a rise in the price of products, it has, all the same, saved the Roumanian oil industry from disastrous falls in prices, which overproduction would have indubitably brought about.

4.—As a consequence of the above mentioned offer the "Astra-Romana" immediately started to purchase small quantities of Roumanian oil from Roumanian companies for the account of the Royal Dutch-Shell group. The purpose for this action was to improve the situation and ensure greater effiicacity to the aim pursued by the "Convention of Conservation." This has constituted a very great sacrifice for the Royal Dutch-Shell group. This group, in view of carrying into effect the above mentioned offer, has bought Roumania oil products that it had no need of, at prices very superior to those on the market, products for which it found no market except to the detriment of its own production from Roumania and elsewhere.

The Board of the "Astra-Romana" Company has been informed by the Royal Dutch-Shell group that the latter is ready to continue making this great sacrifice if the "Convention of Conservation" is continued, as the group wants to help the conservation of the reserves of crude of Roumania as it does all over the world, and has in view only the interests of the oil industry. Naturally the sacrifice cannot be carried on if the "Convention of Conservation" in Roumania ceases.

5.—Until now no proposal has been made for the modification of the existing convention, and the desire of the majority of producers is for the continuation of the convention on the present basis, desire expressed at the producers' meeting of the 18th inst. by the CREDITUL MINIER with whom other companies joined.

Based on the above mentioned facts, the Board of the "Astra-Romana" Company is unanimously of the opinion that the lapsing of the convention of conservation at the end of this month would mean an irreparable error and will cause disastrous losses to the Roumanian oil industry. This lapse will have as an inevitable consequence the cessation of conservation in the whole world, and the beginning of the fiercest fight in all world markets followed by a fall of prices to zero.

If with the present prices no reasonable profits can be obtained, they at least give the industry the possibility to continue to exist. The cessation of the Convention would have as a result the destruction of a great number of producers without causing an increase in the export of Roumanian oil products. The Board of the "Astra-Romana" Company is of opinion that measures should be taken at once to save the situation.

Having discussed the situation in all its details, and having in view the disastrous situation which the cessation of the Convention would bring about not only for the Roumanian Oil Industry, but also for the whole of its national economic life the Board proposes to all producers an extension of the convention in its present form for another period of at least 3 months. This would enable the producers to examine the proposals put forward in the meantime for improving the present convention, and if modifications will be found useful, to come to an agreement about them without causing the finishing of the convention and its inevitable and disastrous consequences.

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Imports and Exports

(Continued from page 20)

excessively high in production costs. Central control, or unit operation, of our oil fields and refineries will bring about lower costs in production than in South America, where the initial development expenditures are enormous. In Venezuela alone the figure has reached $600,000,000.

As regards the petroleum import status of the United States, the total value of crude and refined products in the first ten months of 1930 amounted to $124,618,827 and was represented by 90,223,231 bbls., as will be seen by the following table.

IMPORTS INTO THE UNITED STATES
(First 10 months of 1930)

	Crude	Refined Products
Quantity	52,935,152 bbl.	37,288,079 bbl.
Value	$55,542,982	$69,075,845

Until recently the price of about nine cents per gallon has been maintained on American gasoline exported to other countries. Strange as it may seem independent mid-continent oil men were responsible for cutting prices on export gasoline, and so greatly lowering its value, and it is mid-continent oil men who are the strongest advocates for the tariff. WORLD PETROLEUM is in accord with the many reasons for a tariff policy covering domestic commodities produced on a large scale; but also realizes that petroleum is international and no longer purely a national problem, and that consequently other factors carry weight and need due consideration to avoid loss of export oil business. While production and refining of crude in the United States remains uncontrolled, a tariff is a doubtful means of obtaining better conditions in the oil industry.

▼

Suit Against Pan American and S. O. of Ind.

SUIT has been instituted on behalf of minority stockholders of Pan American Petroleum & Transport Company against Standard Oil Company (Indiana) and its officers, and officers and directors of Pan American alleged to have been designated and elected by the Indiana Company, to compel an accounting to Pan American stockholders for millions of dollars said to have been illegally withheld from distribution in past years.

The complaint, brought by Nathan Burkan, a well-known New York lawyer, on behalf of himself and others, demands an injunction restraining Standard of Indiana from carrying out its offer to exchange seven of its shares for each six of Pan American and restraining officers of the Indiana company from dictating to Pan American officers in the matter of resuming dividends. It demands that Standard designees on the Pan American board be compelled to resign, that all the Pan American stock acquired by Standard in "fraud" of the rights of the plaintiff and other minority stockholders be turned back, that Pan American officers and directors be compelled to resume dividends on the average rate paid since 1919, and that the directors of the two corporations be held liable for dividends withheld on the Pan American A and B common stock when company's net profit and surplus warranted dividends.

Answer to the suit has not been filed at this writing.

World Transportation of Oil Products

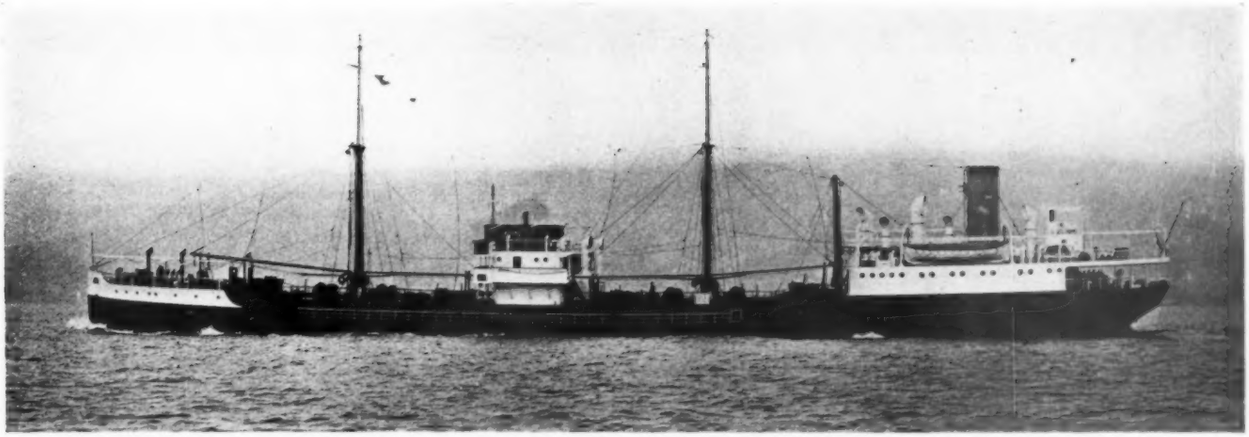
Problems of Building and Operating the Royal Dutch-Shell's Vast Tanker Fleet to Meet the Ever Changing Movements of Oils in the Producing Fields and in the International Markets . .

PRODUCTION, refining and marketing of petroleum are the better known departments of the oil industry, as their very natures draw them into the limelight more frequently than other essential branches. Of equal importance is the big problem of bulk transportation on rivers, lakes and oceans of the crude to the refineries and of refined products from the refineries to the markets of the world. Marine transportation of oils, as it happens, is in far fewer hands than production so has developed into a more orderly and better regulated section of the petroleum industry than has drilling for instance. There are, of course, many tankers operated by independents as tramps, or chartered out, but for the most part tankships function as liners on regular routes, although routes change from time to time and individual vessels are moved from service to service as demand and supply fluctuate. Perhaps this very condition accentuates the problems that continually arise, although the solutions are more easily carried into practice once they have been reached. Altogether there were in operation up to November last 1,410 tankers aggregating 11,508,262 tons deadweight capacity.

The fleets of some of the big international oil companies have now attained tangible proportions. Just how great will be understood when it is mentioned that the 170 ships of the Royal Dutch-Shell organization during 1929 transported approximately 16,000,000 tons of oils and motor fuel, or roughly 120,000,000 bbl. In 1929 the fleet's total mileage was 12,000,000 nautical miles. In 1930 the owned and chartered fleet carried 16,000,000 tons altogether, or about 115,000,000 bbls. of crudes and refined products. All marine transportation for the Royal Dutch-Shell comes under the management of the Anglo-Saxon Petroleum Company, with headquarters in London, England, and which has 23 subsidiary companies. The ships of these subsidiary concerns vary not only in size, but in type, characteristics, and in the flags under which they operate. They vary all the way from the big 10,000 tonners, which carry oil from the Far East across the Pacific to San Francisco, down to small tugs which operate barges in the West Indies, and to shallow-draft vessels operating on the Chinese Rivers. The screw, the paddle and the stern wheel are all used. The Diesel engine, the steam reciprocating engine, the turbine and the horizontal engine all play their part in the propulsion of this fleet.

The most important part of it is that the whole of the operation comes under the control of one man—Cornelius Zulver—and his department. So minute and detailed is the system of control exercised, that any time any information about operating costs, including the expenditure of food, etc., for the crews of any ships operating in the Dutch East Indies or elsewhere for, say, September 23, 1922, or any other time to date, is immediately known. You could have this

The international oil fleets operating out of Lake Maracaibo use the Royal Dutch-Shell dry dock at Curacao.



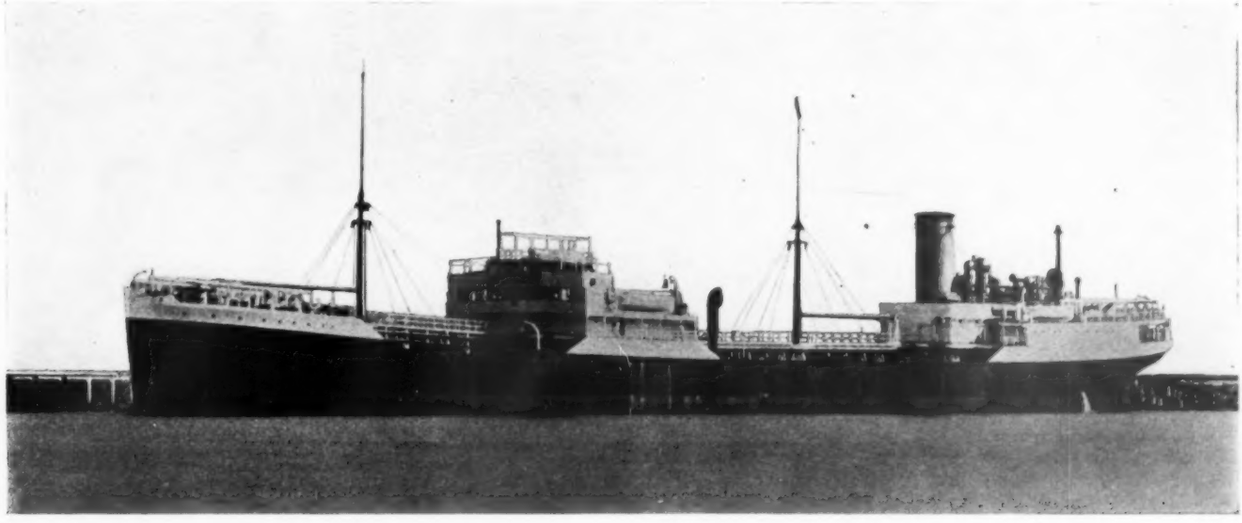
M.s. Agatha,—most of the Anglo-Saxon tankers are built on the Isherwood combination system.

information in your possession if Mr. Zulver could be induced to tell you, but he is extremely reticent and no information can be got out of him regarding the intimate matters of his company's business. There are many large tanker fleets in the world and the majority of them are operated with a degree of high efficiency; but, one ventures to suggest that there are few in which efficiency and thoroughness has been taken so far as with the Anglo-Saxon fleet.

Mr. Zulver is responsible for the economical operation of this large fleet, and he does it all with the relatively small staff. The work of his department comprises new construction operation, victually, fueling and maintenance in seagoing trim of the entire fleet. It is concerned also with the preparation of new designs for ships for service in practically every part of the world. At the moment of writing, the Company is building some 30 tankers of various sizes, of which 20 are large ships of about 11,500 tons apiece, with super-charged Diesel engines, and the rest are smaller vessels such as the sulphuric acid carrying vessel AGNITA, reference to which has been made already in Shipping Notes in the pages of WORLD PETROLEUM.

Besides being very large tank-ship owners themselves, the Anglo-Saxon Petroleum Co. are also extensive charterers, maintaining on time charter a considerable number of vessels at any given time. From the beginning of the era when the Diesel engine began to be a practical working proposition, Mr. Zulver has been an enthusiast as to its possibilities and the result is that to-day, of the fleet of 30 vessels at present constructing, not one is steam propelled. It was his predecessor, Mr. Meyer, who in 1909 interested the Editor of WORLD PETROLEUM in the Diesel engine, and visualized its future. The Anglo-Saxon Company owned as a matter of fact the first of all ocean going motor-driven vessels, the VULCANUS, an eight-knot ship of only 1,194 tons deadweight and 400 horsepower with a consumption of 1¾ tons-fuel per day. This tanker was ordered by Sir Henri Deterding, and went on service during 1910, and is still in active operation in the Dutch East Indies. In nearly 21 years this vessel has covered approximately one million miles. Had she been higher powered and faster this mileage would have been greatly exceeded. From then the interest of Mr. Zulver in internal-combustion engines proceeded proportionately with the increased reliability of those engines for marine work. One of the most epoch-making steps in the history of the Company's tanker fleet was

The Megara was the first tanker to have super-charged Diesels, giving added power and speed without increasing machinery size or weight.



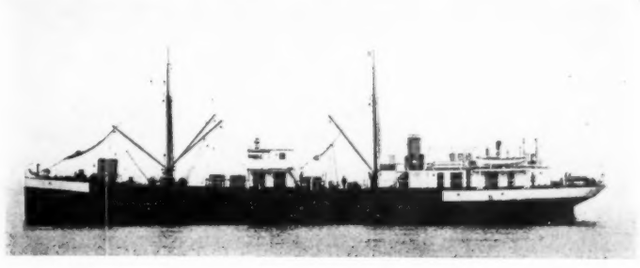
Thirty-five of these shallow-draft tankers operate between the oil-fields of Venezuela and the great Royal Dutch refinery at Curacao, Dutch West Indies.

the placing of orders in 1924 for a fleet of 12 ships, each of 10,000 tons deadweight and 12½ knots speed, fitted with single screws and driven by a special type of Werkspoor double-acting 4-cycle engine, for many refinements of design of which Mr. Zulver himself was personally responsible.

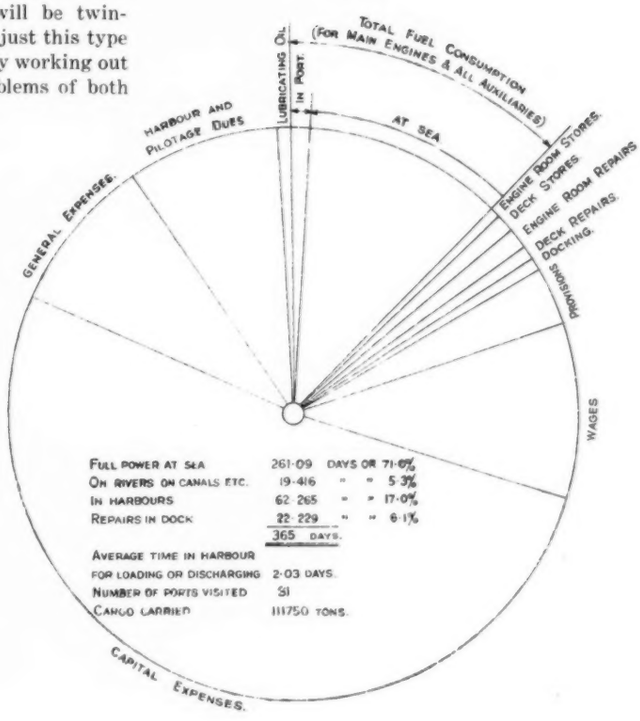
These ships were among the fastest and most highly-powered single-screw motor tankers of their time, as they developed about 4,000 horsepower at 90 revolutions for a speed of 12 knots. They have proved uniformly successful in service and there is on this page a typical chart showing the hard work which the PHOBUS, the first of this fleet to be completed (she was finished in December, 1926), has undertaken. After the completion of the PHOBUS class, Mr. Zulver's company held off construction of large vessels for a while, but operated very actively in the charter market, and in 1930 came the placing of contracts for no less than 20 Diesel-driven vessels of increased carrying capacity and speed.

Ever in the van of progress in marine propulsion, Mr. Zulver has again anticipated some of his rivals in the oil carrying trade by taking advantage of the economic possibilities of continuous supercharge. His new ships are twin-screw vessels and are improved repeats of that remarkably successful ship, the MEGARA, which was the first seagoing vessel to be fitted with a special type of continuous supercharge that increased the power of the engines about 40 per cent without any corresponding increase in weight or size. The MEGARA on her maiden voyages between Curacao and the United Kingdom has made easily 13½ knots light and easily 12 knots loaded. By this speed and economy she virtually revolutionized oil transportation on the high seas and had a devastating effect upon the charter market because the average speed of the chartered tanker two years ago was no more than 9½ to 10½ knots at most. This latter speed to-day is not good enough, and now that the Anglo-Saxon Company is constructing so largely new and fast tonnage, it is bound to affect their requirements from charterers. It is interesting to see what effect an increase of speed without increase of engine size and weight has upon a tanker such as the MEGARA. The new ships now building will be twin-screw vessels and will have just this type of propulsion. Satisfactorily working out a system is one of the problems of both engineering and economic characters faced by the oil company's marine operating department.

Supercharge on the main Diesel engines of a modern tanker, in brief, enables a vessel with engines operating normally at 2,800 brake horsepower and driving the ship at 10¼ knots, to run at 4,200 shaft horsepower and to drive the vessel at 12¼ knots in loaded condition with only slight increases in temperatures and pressures, and with most satisfactory working conditions. The commercial results in what virtually amounts to a 2-knot speed increase without having to pay in first cost or in operating cost anything like the same amount as would be required if the ship were built specially for the higher speed, will be seen to have importance and may be estimated by considering that over a period of 275 "at sea" days per annum, the



In 21 years the 8-knot motor tanker Vulcanus has covered one million miles.


TOTAL FUEL CONSUMPTION (FOR MAIN ENGINES & ALL AUXILIARIES)
LUBRICATING OIL
IN PORT
AT SEA
HARBOUR AND PILOTAGE DUES
GENERAL EXPENSES
ENGINE ROOM STORES
DECK STORES
ENGINE ROOM REPAIRS
DECK REPAIRS
DOCKING
PROVISIONS
WAGES
CAPITAL EXPENSES
FULL POWER AT SEA 261·09 DAYS OR 71·6%
ON RIVERS OR CANALS ETC. 19·416 " " 5·3%
IN HARBOURS 62·265 " " 17·0%
REPAIRS IN DOCK 22·229 " " 6·1%
365 DAYS.
AVERAGE TIME IN HARBOUR FOR LOADING OR DISCHARGING 2·03 DAYS.
NUMBER OF PORTS VISITED 51
CARGO CARRIED 111750 TONS.

Synopsis of one year's operation of the Royal Dutch-Shell tanker Phobos.

supercharged Anglo-Saxon tanker will cover an extra 14,000 miles. Applying this to the particular trade in which the MEGARA herself is at present engaged, we may consider that the round trip distance from Thameshaven, England, to Curacao, D. W. I., being about 8,500 miles, the supercharged ship makes 2.12 voyages more per year than the ordinary 10¼ knot ship. This gives her an extra net freight earning capacity of about $83,750 per year, this fully allowing for slightly increased fuel cost, as a result of the higher power and speed—while the ship must be credited with the greater engine economy obtained by better combustion in the cylinders and by lower pressures than would be the case if the ship were propelled by engines specially designed for the higher powers.

Various estimates have been prepared showing the increase in world carrying capacity by tankers which will be possible when and if the new Freeboard Regulations come into being. J. A. McGovern, managing director of the Furness Shipbuilding Co., for example, suggested in the paper which he read in Holland recently that the existing tanker fleet in the world would automatically have its potential cargo capacity augmented by approximately 530,000 tons. If, however, from the arguments which we have set forth above we suggest that the extra speed which supercharge gives automatically amounts to the same thing as an increase in carrying capacity, because of the extra number of voyages per year, then it makes interesting speculation as to what the increase in carrying capacity in the new Anglo-Saxon tanker fleet of 20 vessels will be, due to the fact that each of these ships is continuously supercharged. An extra freight earning capacity of over $82,500 per year per ship for 20 ships is also a very good indication of the wisdom of the policy which has selected continuous supercharge, and is an example of the way in which a mere mechanical device has thus become an important factor in world economics.

It has been explained that the Anglo-Saxon's ramifications are world-wide. So, too, are the movements of individual ships. Ships arrive in port, discharge and then are sent to certain points—Lands End, St. Kitts or Fayal, for example, for orders and then are despatched to any part of the world where markets require big movements of crude or refined oil. Attached is a table showing a year's movements of a typical vessel, and attached is another table showing the respective positions of 20 vessels of the fleet on a given day. No date is given to this because it may be taken as completely typical, but if the ramifications are world-wide, so also are the units themselves and their characteristics are well suited to make them efficient for their particular work. It may, therefore, be of interest to mention some leading characteristics of large and small vessels of the Company.

The PECTEN class are the largest ships and they have a deadweight tonnage of 10,000 tons with gross tonnage of over 7,000 tons. Their dimensions are 440 ft. x 59 ft. x 32.7 ft. They have a service speed of between 11½ and 11¾ knots on about 14½ tons of fuel oil per day and their draft is 25 ft. 7½ in. The power given by a 6-cylinder double-acting 4-cycle engine is 3,500 b.hp. at 85 revolutions of a single screw. This class of tankers is generally considered as being the first of the really modern and economical conception of bulk oil carrying which has since had such a tremendous repercussive effect not only upon the tankers of other fleets, but also upon the tanker charter market. The ramifications of the PECTEN class of tankers have already been mentioned and are world-wide. The tables attached herewith and in particular the synopsis of one year's operation of the PHOBOS should be studied in detail as being very interesting operating data available from large tanker companies.

Coming down slightly lower in the scale of size, we find such vessels as the ARTEMIS, which is owned by the Petroleum Maatschappij La Corona, one of the subsidiary companies of the Anglo-Saxon group, and is somewhat similar to the AGATHA which we illustrate. This is a ship of just over 5,000 tons and is a twin-screw vessel with two 6-cylinder Werkspoor 4-cycle single-acting engines developing collectively 1,580 horsepower at 120 revolutions. This ship, which has a gross tonnage of 3,809 tons, runs at 9½ knots on 6½ tons of fuel per day. Further down in the scale of size we should mention the AGNITA, which by the time this appears in print will have been launched, as she is one of the most important vessels that Mr. Zulver's Department has yet designed. She is a vessel of 4,600 tons deadweight and carries her cargo on a load draft of 23 ft.

Log Extract, Anglo-Saxon Motor Tanker "Pecten"

Round-the-World Voyage, September 4, 1928—January 12,1929
Vessel 440 ft. by 59 ft. by 32.7 ft., 10,000 tons deadweight, 3,500 shaft horsepower.
Machinery 6-cylinder double-acting 4-cycle North Eastern-Werkspoor.

1928	Sept. 4 — Sailed for Tyne	1928	Nov. 22 — Sailed for Singapore
1928	Sept. 22 — Balboa arrived and left	1928	Nov. 26 — Arrived Singapore
1928	Oct. 3 — Arrived San Pedro	1928	Nov. 30 — Sailed for Suez for orders
1928	Oct. 7 — Sailed for Yokohama W.O.	1928	Dec. 17 — Arrived Suez
1928	Oct. 31 — Arrived Shanghai	1928	Dec. 25 — Left for Gibraltar
1928	Nov. 2 — Left for Hankow (up	1929	Jan. 2 — Passed Gibraltar
1928	Nov. 6 — Arrived Hankow (river	1929	Jan. 7 — Arrived Vlaardingen
1928	Nov. 7 — Sailed for Balik Papan	1929	Jan. 10 — Sailed for Thameshaven
1928	Nov. 18 — Arrived Balik Papan	1929	Jan. 12 — Arrived Thameshaven

1929 — Jan. 15 — Sailed for Fayal for orders

Total miles, 26,500. Average speed, 11.7 knots. Fuel, 14.2 tons per 24 hours full power running.
I.h.p. 4,200 S.h.p., 3,390
Vessel commissioned, May 28, 1927. First docking and engine examination during August, 1928. Delayed at Suez discharging, loading, and awaiting berth.

Operation of M. T. "Phobos"

Owned by the Anglo-Saxon Petroleum Co. Ltd., London.
Built by the Netherland Shipbuilding Company, Amsterdam.
Engined by Werkspoor, Amsterdam, with single-screw, double-acting four-stroke Diesel engine, six cylinder, 850 mm. x 1,500 mm. bore and stroke.

SYNOPSIS OF SERVICE
from 24th DECEMBER '26 [First voyage] until 8th FEBRUARY '29.

Total number of days in service	777
Days at sea at full power	556
Days on rivers, canals, etc., inclusive waiting on roads for tide, etc.	41.5
Days in port for loading and discharging inclusive time waiting for berth	132
Days in port for docking, etc.	47.5
Number of ports visited	65
Average time in port for loading or discharging	2.03 days
Average speed under all circumstances full as well as ballast	11.2 knots
Total fuel consumption at sea	8410 tons
Total fuel consumption in Port	746 tons
Total lubricating oil consumption	9600 gals.
Total cargo carried	237,774 tons

THIS GIVES THE FOLLOWING RESULTS PER ANNUM

Time at sea under full power	261.09 days or	71.6%
Time on rivers, canals, etc.	19.416 days or	5.3%
Time in port for loading and discharging when NO repairs could be effected because of the cargo being motor spirit	62.265 days or	17 %
Time in port for docking and repairs	22.299 days or	6.1%
	365 days	100%

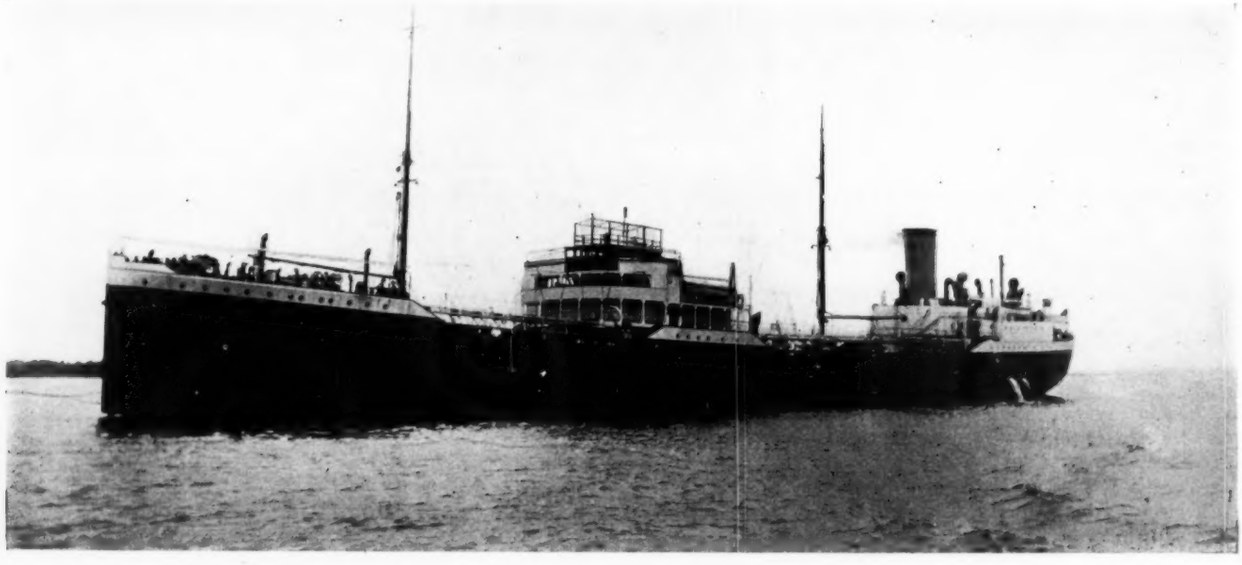
3½ in. The important point about her is that she is intended to carry sulphuric acid outwards to Curacao and crude oil homewards. The acid is carried in twelve cylindrical tanks, six on each side of the longitudinal bulkhead. The tanks are vertical with domed ends and extend from the floors where they are supported on specially constructed stools to a short distance above the upper deck. The acid is carried in bulk in concentrated form, as it is only in this form that it does no harm to the steel of which the tankers are composed.

As the ramifications of the Company extend from the Tropics to the Baltic and from the Baltic to the South Seas, it is inevitable that small ships as well as large ships should be included in the fleet. Mention in the Baltic category should be made of the SIGRID of 1,000 tons deadweight and 1,216 tons gross which "motors" at 10 knots on 5 tons per day and is used for transporting petroleum products between various ports in the Baltic. In the case of the South Seas mention might be made of the PAUA which is one of the few tankers that Harland & Wolff, Ltd., of Glasgow, have built for the Anglo-Saxon Co. This is a ship of somewhat similar size, having a deadweight tonnage of 1,087 tons and "motoring" at 10 knots on 3.35 tons per day. In this ship a Harland-B. & W. 4-cycle engine is used developing 700 horsepower at 133 revolutions. Then there is also the Great Lakes tanker MARTHA E. ALLEN of 3,373 tons deadweight built in the U. S. A. in

Typical Ships of the Royal Dutch-Shell Fleet

NAME Duty Commissioned Type	OWNERS Builders	SIZE Tons D. W./Gross Reg. Dims. (Ft.) Speed (Kts.) Tons Oil 24 Hrs. Load Draft (Ft.)	MAIN ENGINES Builders Type/Screws Cyls. per Eng. Bore x Stroke (In.) Total B.H.P./R.P.M. Cooling Pistons/Cylinders
PECTEN Tanker May 1927 3-Island	Anglo-Saxon Pet. Co. Palmers S. B. & E. Co.	9820/7468 440 x 59 x 32.7 11¼ 14½ 25′ 7½″	North Eastern-Werkspoor 4-cyc. D.A./1 6/32.28 x 59.06 3500/85 F.W./S.W.
PHOBOS Bulk Petroleum Carrier Dec. 1926 Single deck 2 Longitudinal bulkheads	Nederl. Indische Tankstoomboot Maats. Netherland S. B. Co. Ltd. Amsterdam	9871/7412 440x59.4x32.7 11	Werkspoor 4-cyc. D.A./1 6/32.28 x 59.05 4000/90 F.W./S.W.
ARTEMIS Bulk Petroleum Carrier March 1914 Single deck	Petroleum Maats. La Corona. Nederl. Scheepsbouw Maats. Rotterdam	5075/3809 346.66x46.5x27.42 9.5 6.5 22.06	Werkspoor 4-cyc. S.A./2 6/20.5 x 35.43 1580/120 Air/S.W.
AGNITA			
PAUA Bulk Petroleum Carrier June 1927 Single deck 2 Longitudinal bulkheads	Shell Co. of New Zealand Ltd. Harland & Wolff Ltd. Govan, Glasgow.	1087/1259.7 205 x 36.7 x 15 10 3.35 14.1	Harland & Wolff Burmeister & Wain 4-cyc. S.A./1 6/19.7 x 35.43 700/133 Oil/S.W.
VULCANUS Bulk Petroleum & Case Oil Carrier Jan. 1911 Single deck	Nederl. Indische Tankstoomboot Maats. Nederl. Scheepsh. Maats. Amsterdam	1194/1179 195.75x37.75x13.17 7 1.75 12.38	Werkspoor 4-cyc. S.A./1 6/15.75 x 23.625 370/150 Air/S.W.
SHELL MEX I ex Lara Tanker —1915 No summer tanks	Anglo-Saxon Pet. Co. Gebro. Pot. Bolnes	1000/927 190 x 32.7 x 13.2 7 12′ 9″	Werkspoor 4-cyc. S.A./1 6/15.75 x 27.56 460/175
SHELL MEX II ex Hera Tanker —1915 No summer tanks Bridge aft	Anglo-Saxon Pet. Co. Dordrecht S. B. Co.	534/538 163.4 x 28.7 x 11.4 8 11′ 4¾″	Kromhout 2-cyc. S.A./2 4/15.75 x 17.75 550/250

The Bulyses belongs to the Pecten class of ocean-going tankships.



September, 1928, and which is one of several small tankers chartered for this work. This brings us to another point which should be made in assessing the success with which the Anglo-Saxon fleet operates, and that is the standardization of engine type. There are a great many tanker fleets in the world all of which operate with reasonable success, but very few with the complete success and absence of mechanical breakdown which characterizes the Anglo-Saxon fleet. This is due mainly to the fact—apart from questions of very careful supervision, of course—that the powering throughout the fleet is more or less standardized. Throughout the twenty large ships now finishing off, 4-cycle single-acting supercharged engines are used.

Throughout the twelve ships of PECTEN class, to which attention has been called above, Werkspoor 4-cycle double-acting engines are used. The result of this as far as those ships are concerned which are all working on ocean trade routes, is that should engine breakdown occur at one port and a spare part is needed, the ship which follows to that port can bring that spare part. Alternatively, a stock of spare parts can be kept at ports at which the Company's large tankers are likely to call, and also there is another fact which perhaps is more important and that is that engineers can be transferred quickly from one ship to another without feeling that they are in any way in a strange ship. So many other tanker companies seem to have gone out for the policy of fitting almost a different type of engine to every ship which they own. This does not make for harmony of working, for cheapness of repairs or for standardization of working, nor does it necessarily reduce the first cost. It would rather seem from what has been said above that it is only the motor tanker which matters today. This, to a great extent, is true, and as far as the large tanker companies are concerned very few steam tankers are being built today. The Anglo-Saxon Company has cut them entirely out of its present or any future programs. This is interesting, as up to now all the tankships built for the Venezuela-Curacao service have been steam-driven, and there are 35 of 13,000 to 17,000 bbl. capacity each. Details were published in WORLD PETROLEUM for February, 1930.

The smaller vessels of the Company tend towards the use of the Kromhout oil engine, although in early ships, including the SHELL-MEX I, built in 1915 of 1,000 tons deadweight, a Werkspoor engine is used. In SHELL-MEX II, which is a slightly smaller vessel, a Kromhout engine is used, and here again the same policy of standardization is employed because the engines which are main engines for propulsion in this case are auxiliary engines in the case of most of the large tankers. A pair of Kromhout engines is used in the recently completed ZEVEERRA, a 735 tonner, which flies the Cherifian flag and operates with a French crew on the Moroccan coast. So the fleet goes on down to the very smallest units which are shallow draft ships used on some of the Central American rivers and propelled by aerial propellers. Also there are floating docks in Curacao and shallow draft special ships with torpedo-boat destroyer engines taking steam from water-tube boilers in rivers like the Yangtse Kiang, vessels built to "jump" the rapids.

The Anglo-Saxon Company is one of the few companies in which the owner defines its absolute requirements to the builder, and makes the builder build to please him, and not to please the requirements of the builder's naval architect. This is an advantage to the builder for price quoting and avoids misunderstanding. It is generally admitted that Anglo-Saxon specifications are clear, definite and detailed in respect of requirements and design, and the results of this are best shown in the success which the ships of the fleet have in operation. Respecting its new tonnage, the company feels that the design adopted makes for the most economical type of oil-carrying vessel having the highest dividend earning capacity. In times of low freight rates these ships can compete successfully with other vessels in identical voyages.

The Anglo-Saxon Company has been among the largest charterers of oil tank tonnage for the last 5 or 6 years. They have even gone to the length of selling their old steam tonnage and chartering it again on long-term charter basis. It is readily understandable, therefore, how their newest, and so far their largest constructional program, has affected both the charter and therefore the construction markets, concerning which Sir Henri Deterding had some interesting remarks to make in his Report of Operations of the Royal Dutch Company for the year 1929 which was referred to in some detail in WORLD PETROLEUM for June last. "The Anglo-Saxon fleet," he said, "supplemented by chartered vessels was continuously in service. At the close of the year the Anglo-Saxon group employed nearly 2,000,000 tons carrying capacity including the fleet of the Eagle Oil Transport Company. Towards the end of the year 1929, orders were placed for seven small motor vessels of 2,000 and 3,600 tons loading capacity built with the idea of gradually replacing older coastwise ships." Further orders were placed at the beginning of this year for 20 motor vessels of 11,500 tons loading capacity apiece. A. C. HARDY.

This bulk gasoline carrier is chartered for inland waterway service. Chartered ships in world service covered 7,000,000 miles, in addition to the 12,000,000 miles by the company's own fleet.

Colombian Engineer and Royalty System

A Native Colombian Oil Expert Expresses Viewpoint Regarding the Fundamentals of National Oil Legislation in the National Interest

. . . Reviewed by Dr. O. W. Willcox

OIL legislation in Latin-American countries has given rise to many serious difficulties in the relations of native governments with foreign capitalists who have acquired concessions for the exploitation of petroleum deposits—difficulties that have sometimes led to critical diplomatic situations. As has been frequently pointed out, the source of this strife between the local governments on the one hand and the foreign capitalists and the governments that protect them on the other hand can be traced mainly to fundamental differences in the conception of mining rights. The traditional Latin-American position is that the subsoil and all that it contains is inalienable national patrimony, and that in respect of minerals the rights of the government are at all times paramount to those of the holders of surface rights. This doctrine of itself would create little difficulty if all the Latin-American governments could obtain and act upon competent technical and economic advice as to the best means of capitalizing their ownership of natural resources. And the best means of capitalizing these resources in Latin-American countries in general and in Colombia in particular does not lie in the system of royalties which the Spanish colonial governments bequeathed to these countries.

Such is the thesis of a book (*) lately published by Sady Gonzalez B., civil engineer and ex-inspector nacional de petroleos to the Colombian government. Here, if anywhere, we may expect to find the matured opinions of an intelligent, educated Colombian, who by training and experience should be competent to discuss the technical and economic aspects of the petroleum question from a reasonable national standpoint.

As regards the state of facts, Mr. Gonzalez has a fairly simple case before him. So far, only one foreign corporation, the Tropical Oil Company, has obtained a substantial foothold in Colombia, and all the contractual relations of the Colombian government in the oil business are with this corporation. The operations of the corporation within the country, the amounts of oil it has produced and shipped to the port of export and to the local refinery, the income it has derived from local sales of petroleum products, the payments it has made to the government, etc., are matters of public record. Mr. Gonzalez has, in effect, only to examine the total output and compare the benefits that have accrued to the foreigners on the one hand and to the native owners of the oil on the other.

The result of this examination, as Mr. Gonzalez interprets them, are distinctly unfavorable to the royalty system which tradition has fastened on all or most Latin-American countries; while still asserting the principle of national ownership of natural resources he unsparingly condemns the practice of farming out these resources on a share basis, by which the government receives a certain percentage of the crude product which it must either accept in kind or commute for cash payments at a rate over which it can exercise no control.

As would be expected of an engineer Mr. Gonzalez concretely bases his objections to the royalty system as it has worked out in Colombia. By the terms of its oil contract the government receives 10 per cent of all oil produced by the oil company and, as stated above, it may either take its share in kind or accept its money value at the port of export. But since the government lacks facilities for refining crude oil, and above all since it lacks the technical and business skill that would enable it to go into the world market on an equal footing with the great oil companies and refineries, it necessarily is forced to accept cash payments on the basis of New York or London quotations, which are more or less fixed by the companies themselves and which in recent years have shown a sagging tendency. The general result is that in proportion as foreign refineries benefit by cheaper supplies of crude the government's royalty becomes proportionately less and less as the volume of output increases. In other words, he argues, the owners of the oil carry the burden and the foreign consumer reaps the benefit. The local government has no control over the rate at which it must accept payment, but that this rate is or may be unreasonably low is apparently shown by the recent demand of the independent American oil producers for a duty of 80 cents a barrel on South American oil, on the ground that this oil is obtained at prices that are ruinously low from the American standpoint. Further details cited to show that the Colombian government has made a bad bargain are interesting, but they cannot be taken up here. [See page 20—Editor.]

It is the above-mentioned insistence by the Americans on protection against dumping of South American crude petroleum that furnishes Mr. Gonzalez with a sign-post pointing to the hub of the problem: If Colombian oil is sold abroad at such low prices that it ought to be taxed, the tax should be laid at the port of exit rather than at the port of entry, thus giving effect to the economic principle that the consumer is the one who should pay the full value of the product.

Mr. Gonzalez has other grounds for objecting in principle to the royalty system, but it is this threat of foreign taxation of Colombian oil that furnishes him an outstanding reason why the ancient system of exploiting petroleum resources on a share basis should be forthwith abandoned in favor of an export tax. Such a shift, in his opinion, would at one stroke change the position of the local governments from one of subserviency to the great oil companies into one where they would be real masters in their own house, and enable them to assure themselves, as real owners of the oil, of a genuinely equitable share in its proceeds. Naturally, he says, such export taxes should be reasonable and flexible to avoid killing the goose that lays the golden eggs, but they should be laid primarily with the idea that if there are any excess profits in the business the said profits should accrue to the country of origin rather than to the foreign consuming localities. Under present condi-

(*) Studio economico sobre el problema del petroleo en Colombia, por Sady Gonzalez B., Bogota: Escuela Tipographica Salesina, 1930.

tions in Colombia, he thinks that an export tax of 10 to 40 cents a barrel, depending on the quality of the oil and the needs of the government, would be about right.

All this is preliminary to the real object of the book, which is to point out the pitfalls that the framers of the pending revision of the Colombian oil law have prepared for the country. This new law now before Congress has been characterized by some interested outsiders as containing evidence of "growing enlightenment" on the part of the Colombians, but our author finds it merely another exemplification of the childlike innocence of Latin-Americans in the economics of the oil business. The chief and indeed the fatal defect of this law as he sees it is that it is based throughout on the ancient idea that the government should take its pay in oil or its cash equivalent, instead of leaving the industry free of all imposts except an export tax. It would take too much space to notice all the arguments brought up to show how reduction of the whole matter to an export tax would make matters easier all around, but a perusal of Mr. Gonzalez' study has left the present reviewer with the impression that he is honest in his endeavors to make out a reasonable case.

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Prussian Government Becomes an Oil Producer

By Dr. Richard Lewinsohn

Financial and Commercial Editor
Vossische Zeitung

THE Prussian government, which already possesses large coal and potash properties, has now entered the oil industry. Through the mining company "Preussag" of which it is the sole owner and stockholder, the government has bought a petroleum property for 8 million marks. The former owner, Anton Raky, one of the most active among German petroleum engineers, had fallen into financial difficulties on account of a too rapid extension of his investments and found himself obliged to sell a part of his holdings in Hannover. He had already received several overtures, the most favorable among which was an American offer which is thought to have emanated from the Sinclair group and whose bid is said to have been in the amount of two million dollars (8.4 million marks).

In order to prevent the terrain from falling into American hands the government intervened and acquired the property for itself. The property covers an area of about 350 hectares, on which there are four producing deep wells, and two others at depths of 4 and 5 hundred meters. At the present time the yearly production of the four deep wells is 168,000 bbl. of crude oil. Since the total production this year in Hannover is estimated at 1,050,000 bbl. (in 1929 only 700,000 bbl.) it will be seen that the new government oil field will furnish about 15 per cent of the total German oil production. However, this amount is scarcely one per cent of the total German oil requirements, so that at the present time the Prussian government will not be able to exert much influence on the German oil market.

This transaction on the part of the Prussian government has been somewhat critically and skeptically regarded by the German public. The government explains the purchase by saying "one must make a beginning sometime." It evidently does not believe that it will obtain any notable profits from its purchase, but it wishes to acquire experience as an oil producer, especially in technical matters, and then enlarge its oil properties as occasion offers. It is probable that the oil contracts made by the North European Oil Corporation, an American concern, in Oldenburg prompted the Prussian government to engage in oil production on its own account.

Oberg field, where 2100 ft. is considered very deep.

Oldest well in Germany; drilled in 1859 by the Hannover Government and still producing.

The fundamental reason why the Prussian government has not been content with an indirect control of oil production, but has entered the field as a competitor of private enterprises, lies in the legal situation. Whereas most of the other German states, for example Oldenburg, hold options or the privilege to grant concessions, in the most important of the German oil districts, Hannover, the oil industry is completely free from governmental entanglements. The farmers in Hannover, which was formerly under English rule, still enjoy many privileges and are politically well organized in the so-called "Welfen party," and on account of this traditional background the Prussian government cannot make any changes in the existing oil legislation. Therefore, if the Prussian government desires to exercise any influence on German oil production it must itself enter the business as a producer.

It may be noted that quite recently traces of oil have been found outside of northwest Germany (which includes Hannover, Oldenburg, Bremen, Hamburg). A well has been sunk in the Prussian province of Pomerania. However, the geologists are very conservative about prospects in that region. Last week traces of oil were found in central Germany, at Kassel. At present, however, the only producing district is Hannover.

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The Foreign Oil Legion

GEO. S. HARRISON, director of the Home Oil Company, Ltd., Vancouver, has recently completed a ten months' world trip.

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ROBERT W. MCDOWELL, vice-president, Mid-Continent Petroleum Corporation, Tulsa, Okla., has returned from a business visit to France and England, where he made a study of the marketing of United States mid-continent petroleum products.

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M. C. SEAMARK, field-manager, and L. C. Scott, field-superintendent, Anglo Persian Oil Company, arrived in New York aboard the MAURETANIA on December 15th for a two months' study of latest American oil field and equipment practices.

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FRANK BOVARD is now the assistant field superintendent at Chauk, Upper Burmah, for the Burmah Oil Company.

▼

DON PATRICIO HEENEY, better known as just plain Pat, who for fifteen years has been a familiar figure in oil circles in Venezuela, recently became field-

Pat. Heeney, of Maracaibo, Venezuela

representative in that territory for the Columbian Steel Tank Company. Mr. Heeney knows intimately the problems of oil production in South America, and has engineered dozens of large installations there. He has offices in Maracaibo.

SIR HENRI DETERDING has left London, and is on his annual winter vacation at his beautiful home in St. Moritz, Switzerland.

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J. ELMER THOMAS, whose article "The Law of Diminishing Returns" in the March issue of WORLD PETROLEUM created such great interest, was due back in the U. S. A. before Christmas. Unfortunately he severely injured his leg while in Germany.

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DR. V. HENNY, European representative, Universal Oil Products Co., has recently made a business trip to Vienna, Austria.

F. Godber, Director, Royal Dutch-Shell group who recently left New York for London.

GERALD H. DILLON, sales manager, Walter E. Lummus Co., is touring Europe with a view to familiarizing himself with the refining outlook in different countries.

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E. L. ESTERBROOK, consulting-petroleum-engineer, Pan-American Petroleum and Transport Company, is visiting the Venezuelan oil properties of the Lago Petroleum Corporation.

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KARL VAN DER KAMP, production-superintendent, Venezuelan Oil Concessions, is on a five months' vacation in Europe, visiting Holland and Switzerland.

GEO. LEGH JONES, president, Shell Oil Company of California, has arrived in London in connection with the business of his company.

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HOYT SHERMAN, assistant general-agent, Venezuelan Gulf Oil Corporation, in Venezuela, has returned to Maracaibo from his vacation in Europe.

▼

J. H. SENIOR, president, West India Oil Company, has been to Germany, via England, attending the launching of a new Diesel oil-tanker named after him. He was due back in New York about December 23rd, after the closing of January WORLD PETROLEUM for press.

J. H. Senior, President, West India Oil Co.

Blank & Stoller

ROY NEWTON. general-superintendent, Venezuelan Gulf Oil Corporation, is back in the Bella Vista terminal, Maracaibo, following a visit to the United States. He took a busman's holiday and went to the Tulsa Oil Show.

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W. E. D. COLE, field-superintendent, Anglo Persian Oil Company, has been transferred from Persia to Iraq.

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DR. G. M. LEES has been appointed chief geologist of the Anglo Persian Oil Company. He took up geology study as a hobby when assistant political officer in South Kurdistan, and later qualified at the Royal School of Mines.

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G. F. MCKILLOP, plant manager, Commonwealth Oil Refineries, recently returned to Australia after a visit to England.

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W. M. BROWNING, branch manager of the Burmah Shell Oil Company at Madras, has been elected to the Madras Legislative council.

U. S. PRODUCTION REVIEW

	Daily Production bbl.	Daily Runs to Stills bbl.	Gasoline Stocks bbl.	IMPORTS Total bbl.	IMPORTS Gasoline %
Week Ending Nov. 8.....	2,315,881	2,274,600	37,012,000	249,714	16.6
Week Ending Nov. 15.....	2,305,924	2,292,700	37,263,000	196,000	22.4
Week Ending Nov. 22.....	2,270,130	2,290,800	36,532,000	293,571	13.4
Week Ending Nov. 29.....	2,267,405	2,246,300	37,287,000	318,714	6.1
Week Ending Dec. 6.....	2,226,936	2,187,300	37,742,000		

Underlined figures indicate improvement in statistical position:- decrease in production, runs to stills, gasoline stocks or imports.

Crude Oil Prices

Mid-December

FURTHER reductions in crude oil prices were made by the non-cooperating refiners, the Champlin Refining Co. and the Eason Oil Co. (40 deg. Be. cut from $1.07 to $0.87 per barrel) of Oklahoma, and the Cosden Oil Co. of Texas (flat 50 cents per barrel rate, 20 cents under market). Both these cuts affect but little crude, and so far have not been followed by other purchasers. As a matter of fact the companies supplying the Cosden Oil Co. in Howard and Glasscock Counties of Texas (Simms, Continental, Amerada, Kirby and Sun) refused to sell, preferring to shut their wells in. Present indications are that current quotations will hold up in Mid-Continent area, though cuts may be anticipated in California and Rocky Mountains, these two districts being not affected by the November price revisions.

Considering that proration has been eminently successful and that small independent producers have reduced their output by 50 per cent, and in few instances produce but *one* per cent of their potentials (Oklahoma City Pool), the price structure in Mid-Continent should be raised. This point of view has been continuously held by the Independent Petroleum Association of America (Wirt Franklin, Chairman), and lately the Dutch-Shell interests advocated the higher prices through the press. In all probability all the larger companies are willing to do so, but there are few smaller refining units that desire to exploit the present distress structure to the utmost.

Proration

ON December 6th the Century Oil Co. and the Marco Oil & Royalty Co. served notice to the State Corporation Commission that they will produce their wells in Oklahoma City Pool to fulfill their requirements and to prevent the alleged underground waste. On December 7th these two companies opened their wells. Preliminary steps for a receivership on the properties of both companies for alleged violation of the corporation commission proration rules in the Oklahoma City Pool have been taken by the commission.

In Texas the Van Pool has been allowed to gradually increase its production from 27,500 bbl. currently to 50,000 bbl. by February 15th, 1931. This decision of the Texas R.R. Commission raised much criticism, as it resulted immediately in reduction of purchases in North Central Texas and in Texas Panhandle, affecting scores of minor independents, while benefiting but the Pure Oil Co. and the Humble Oil Co. (Std. N. J.). In all probability the matter will be compromised by allowing only a small increase to the Van Pool.

In California the State Supreme Court declared the California Gas Conservation Law definitely constitutional. In part the decision read: "We are entirely satisfied that the waste of these natural resources may be regulated and the unreasonable waste thereof may be prohibited in the exercise of the police power of the State," and again—"gas which has been allowed to come to the surface without its lifting power having been utilized to produce the greatest quantity of oil may be said to amount to an unreasonable waste of natural gas. That the legislature intended to prohibit such waste of natural gas and so defined the term unreasonable waste is quite apparent," and finally that though—"it is contended that the real purpose of the statute is to curtail the production of oil so as to regulate and stabilize the market price thereof. We cannot agree with this contention. Obviously the enactment is an effort on the part of the legislature to conserve for present and future needs great natural resources in which the people of the State are interested. It may be that the enforcement of the statute throughout the gas and oil-producing sections of the State may have an effect upon the market price of oil. For this reason the subject matter of the act is a delicate one for legislative treatment and judicial cognizance but the fact that the field of economic law to some extent may thus be invaded may not justify the avoidance of the statute."

To consider the matter of crude oil price structure and proration, as well as tariff, from strictly impartial points of view, one must realize the following striking conditions: That U. S. domestic production has decreased from its peak of 2,980,000 bbl. per day in August of 1929, to but 2,226,936 bbl. per day currently (24 per cent decrease), this figure incidentally being the lowest in four years, at the same time the imports have gradually increased from 228,000 bbl. per day in 1927, to 414,000 bbl. per day in September of 1930 (in terms of crude oil, figuring on 33 per cent gasoline recovery), almost a 100 per cent increase. Independent producers considering the above figures may well feel that they are being flooded out by imported oil, especially so since even Soviet Russia began to dispose of its petroleum products on the U. S. eastern seaboard. More particularly in the last three weeks the imports have increased from 284,000 bbl. per day to 358,000 bbl. (in terms of crude oil, as above), a *74,000 bbl. increase*, while the domestic producers reduced their output by *75,000 bbl.* only by great effort.

Pipe-Lines

THE last quarter of 1930 has been more particularly noted by the gradual withdrawal of the Prairie Pipe Line Co. from the crude oil purchasing business in Oklahoma, Kansas, North Texas and Texas Panhandle, where that company was a dominating factor for many years. After January 1st, 1931, Prairie Pipe Line Co. will cease all its purchases. The primary reason, of course, is that Prairie was almost exclusively a purchasing, transporting and marketing agency, and lately was obliged to store as much as 1,500,000 bbl. per month, until today its stocks are about 60,000,-

000 bbl. of crude oil, or about 10 per cent of the country's storage. A direct cause of withdrawal was cancellation of purchases from Prairie by the Standard Oil Co. of N. J. and by the Vacuum Oil Co. The first of these two companies will be served by a new line (Ajax—two 10-inch) from Glen Pool (Oklahoma) to Wood River, Ill., and also by a new Humble Co. line into the Van Pool in Texas, connecting with the Baton Rouge refinery, while the Vacuum through closer relationship with the Standard Oil Co. of N. Y., will be served by that Co.'s Mid-Continent subsidiary, the Magnolia Petroleum Co. . . In all probability the Prairie Pipe Line Co.'s former connections will be re-distributed between other pipe lines, though because Prairie served many thousands of very small wells. The American Petroleum Institute has advised Secretary Wilbur of the Navy Department that it is seeking a means of relieving the threatened extinction of 10,000 small operators in Oklahoma and Kansas resulting from Prairie's action.

Additional radical changes in the pipe line situation of the Mid-Continent include the completion of the Gulf Co.'s 10-inch line from Oklahoma to Pittsburgh, Cincinnati and Cleveland, and also the completion of the Sinclair-Texas Pipe Line Co. line from Oklahoma City Pool to Sinclair's Coffeyville, Kansas, refinery.

Though these huge projects greatly improved the transportation facilities of the companies owning the lines, the cause, if not the reason, of their construction has been very likely the agitation for the tariff. With these lines in operation, opposition to the tariff from this quarter may be expected to subside.

Railroads vs. Pipe Lines

THE railroads which were steadily losing business to the pipe lines, both in crude oil and in gasoline transport, are attempting to amend the transportation act so that pipe line common carriers shall be subject to the same restrictions as to the transportation of commodities in which they are interested, directly or indirectly, as the railroads are now.

Of more constructive nature, and to prevent further building of gasoline pipe lines, the railroads are reducing their rates for motor fuel from Mid-Continent area to Kansas City, St. Louis and Chicago. Also the American Car and Foundry Co. and the General American Tank Car Corporation are completing designs of tank cars with capacity of 22,000 gallons.

Potentials

CONSIDERABLE publicity was given lately to excessive potentials as indicated by various proration committees. The proration potential of U. S. as of November 1st, 1930, was 13,782,477 bbl. per day (1,870,000 m. tons), while estimated reasonable potential was but 4,583,798 bbl. per day (623,000 m. tons). The reasonable potential has been derived by considering all fields flowing open for a period of from 30 to 60 days. But regardless of the fact that the above figures are undoubtedly correct and that 45 days open flow will reduce the potentials as indicated, such open flow will result, in these 45 days, in further increase of the unwanted storage by about 200,000,000 bbl., or approximately by 30 per cent. It must be also noted that in the case of two lime-

Summary of Oklahoma City Pool Operations to Nov. 1st, 1930

	Completed Producing Wells						Drilling Investment	Arbuckle Limestone production to date	Arbuckle Limestone production av. per well to date	Simpson Sands production to date	Approximate Income to date @ $1.30 per bbl., less 1/8th Royalty	Estimated Open-Flow potential production per 24 hrs.
	Arbuckle Limestone	Gas	Simpson Sands	Drilling Wells	Dry Holes	Total Operations	$	bbl.	bbl.	bbl.	$	bbl.
I. T. I. and I .T. I. et al (Empire Oil subsidiary)	74	12	249	21	8	364	47,400,000	9,237,000	125,000	8,450,000	20,600,000	1,250,000
Sinclair Oil Co.	6	7	54		3	70	9,100,000	588,000	98,000	2,920,000	4,000,000	400,000
Slick and Slick et al	11	1	67	5	7	91	11,800,000	2,234,000	202,000	1,260,000	3,970,000	500,000
Phillips Petroleum			7	31		38	4,500,000			70,000*	80,000	50,000
Wirt Franklin			36	2		38	4,500,000			3,190,000	3,620,000	250,000
Skelly Oil Co.			19	1		20	2,600,000			970,000	1,100,000	125,000
Anderson-Prichard			18	5		23	3,000,000			80,000*	90,000	100,000
Coline Oil Co.	8	1	26			35	4,600,000	1,173,000	146,000	2,270,000	3,910,000	100,000
All others	14		66	62	4	146	19,500,000	2,374,000	169,000	2,940,000	6,050,000	550,000
Total	113	21	542	127	22	825	107,000,000	15,606,000	138,000	22,150,000	43,420,000	3,325,000

Estimated number of wells to be drilled in the future	300	39 000,000	
Estimated all additional Costs		34,000,000	
Tota Development Cost		$180,000,000	
Estimated future recovery bbl. @ $1.15 per bbl. & less royalty		280,000,000	$280,000,000
Total Gross Income			$323,000,000
Less 3% State Tax Prod.			$ 10,000,000
Less Development Cost			$180,000,000
Indicated Profit			$133,420,000

Estimated Reasonable Potentiil Production bbl. per 24 hrs. 800.000

* Small recovery due to all wells being very recent.

GEOLOGY:—Faulted Anticlinal Fold;
100 feet of closure on the surface;
500 feet of closure at 6200 feet; faulted on the East side with 1500 feet displacement;
Permian Formations from surface to 2200 feet, no producing zones;
Pennsylvanian Formations from 220 feet to 6200 feet, from 4300 to 6200 feet several minor oil pays (not exceeding 200 bbl. per day) and several zones carrying large volume of gas
Major Unconformity at 6200 feet overlying a truncated Pre-Pennsylvanian Fold, with Arbuckle limestone (Ordovician) forming the core, flanked by sands and green shales of Simpson Series (Ordovician), Viola limestone (Silurian), Sylvan shale (Silurian), Hunton limestone (Siluro-Devonian), Chattanooga shale (Mississippian) and Mississippi limestone (Mississippian). Simpson Sands and Arbuckle Limestone are the major producing horizons in the pool. Production in both formations encountered at about 6500 feet.

AREA and RECOVERY:—

Proven Acreage for Arbuckle limestone production	1,500 acres	Future Recovery	Negligible
Future expectancy	@ 1,000 bbl. per acre	1,500,000 bbl.	
Proven Acreage for Simpson sands production	8,000 acres	Future Estim. Recovery	280,000,000 bbl.
Future minimum expectancy	@ 30,000 bbl. per acre	240,000,000 bbl.	
Future maximum expectancy	@ 40,000 bbl. per acre	320,000,000 bbl.	

Average Acreage per Well—to-date 11. 5 acres (minimum 3.72 acres in NW/4 Sect.2-T11N-R3W)
—estimated future 8.46 acres.

stone fields, the Yates and the Hobbs, proration is imperative, as otherwise water flooding would ruin these fields very rapidly. The combined potential of these two pools is 6,500,000 bbl. per day, but if open they would hardly produce 650,000 bbl., and conning of water would almost immediately reduce this figure in half.

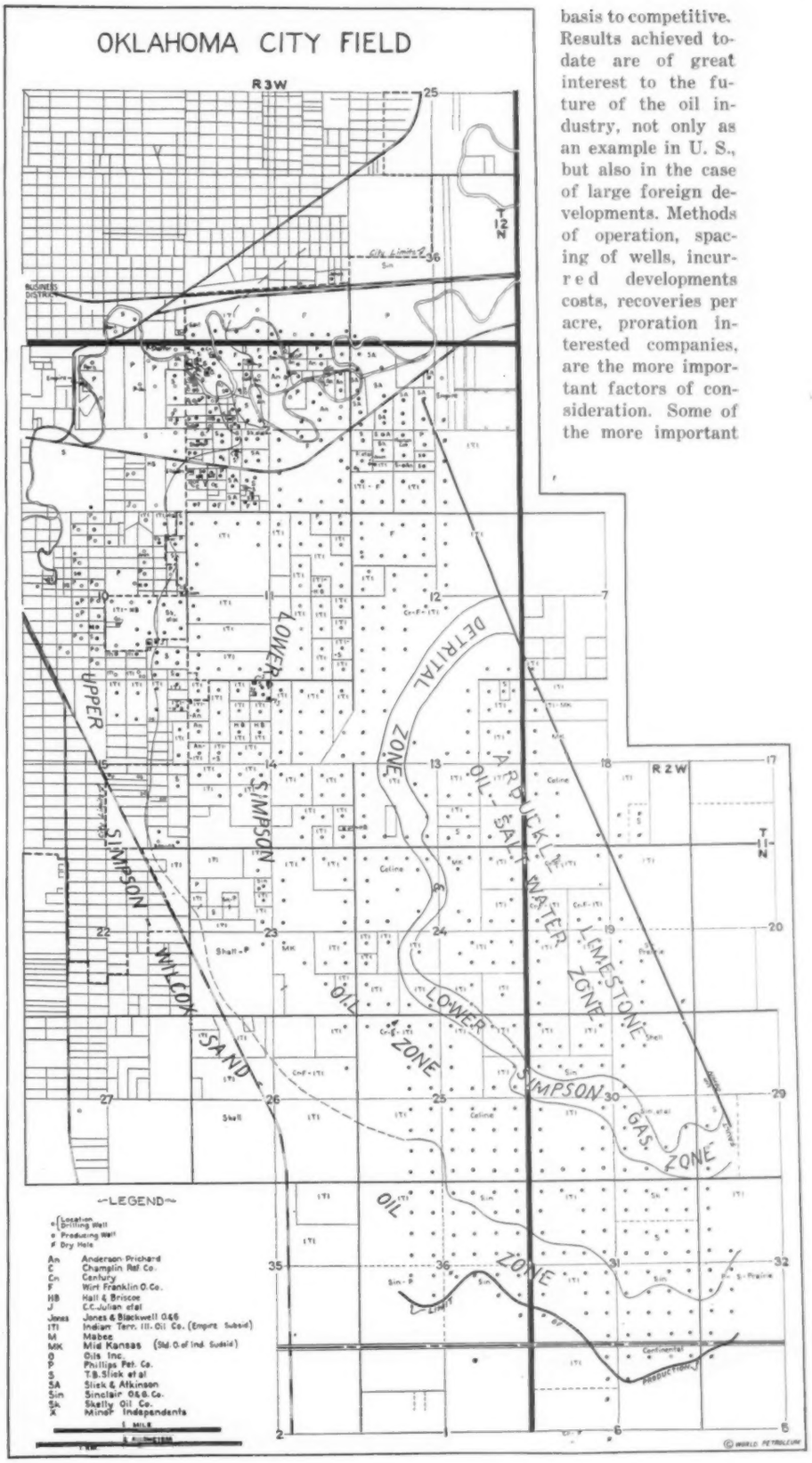
Therefore, while huge potentials have depressing influence on the general situation, their reduction by flowing the wells open would further greatly increase the stocks, would reduce cummulative recovery in most of the flush areas, and certainly would not bring the production down to demand figures for two to four years. Proration is the primary stabilizing factor of the producing branch of the industry, and in connection with reduced manufacture of gasoline, will undoubtedly result in putting the oil industry on a profitable basis within a short period of time. *Even at this time there are indications that the oil industry may disregard the half measures recommended by various commissions and committees and proceed to radically curtail both crude oil production and manufacture of gasoline to such an extent that stocks will be reduced to desired levels regardless of seasonal slack in demand and current depression, thus completely stabilizing the industry within* 1931.

New Mexico: Hobbs

THE indicated potential production in this field reached 1,010,356 bbl. from 130 wells, on 116 units of 40 acres each. The allowance for December was 30,031 bbl. per day, or 2.98 per cent of the potential.

The Fields

IN the past few years several fields were opened in U. S., which have been and still are exceptional in area extent, potential production and cumulative recovery, and consequently are of great importance in the national situation. These pools include the Yates and Van of Texas, the Hobbs of New Mexico, the Oklahoma City of Oklahoma and the Kettleman Hills of California. Combined these five pools have a potential daily production of 10,164,000 bbl. (1,380,000 m. tons), or about 74 per cent of the indicated potential of the U. S., this data assigning but 75,000 bbl. to the Kettleman Hills, that field being capable of a huge potential as well if developed. All these fields are developed by various methods, from unit



basis to competitive. Results achieved to-date are of great interest to the future of the oil industry, not only as an example in U. S., but also in the case of large foreign developments. Methods of operation, spacing of wells, incurred developments costs, recoveries per acre, proration interested companies, are the more important factors of consideration. Some of the more important

fields will be discussed in the WORLD PETROLEUM, accompanied by detail maps. For further comparison the largest foreign pools will be also presented.

Oklahoma City Pool

THE Oklahoma City pool, discovered two years ago (December, 1928) by the Indian Ter. Illuminating Oil Co., has been developed on the competitive basis. On November 1st, 1930, as indicated on the table, the total number of operations reached 825, while by January 1st, 1931, total operations increased to 875.

Development proceeded with some measure of control on the South end of the field, where the number of wells per 160 acres did not exceed 16, but when the operations extended into the City with its very small tracts, as many as 43 wells were drilled on 160 acres. As a whole the number of operations has been much too excessive even on the South end.

Only one horizon is considered as of great importance, the Simpson, and in the area of Lower Simpson the total thickness of sand probably does not exceed 150 feet separated into thinner beds, while the Upper Simpson will not average over 150 feet of the unbroken pay sand. All adjoining wells are producing from the same horizon, therefore, it is evident how much unnecessary drilling took place in the pool.

The crude oil tests between 38 deg. Be. and 45 deg. Be., averaging 40 deg. Be.

Proration in effect allows 4 hours' open flowing of wells each 12 days (1.4 per cent allowance). This method of proration wastes very large volume of sag, speeds the flooding of the field because of suction conning, reducing cumulative recovery, and also results in intermittent supply of oil and income in the case of smaller companies; as admitted by most interested concerns the existing proration method is highly objectionable, but the lack of cooperation and trust between operators did not allow so far the change to the tractional flow proration, though such change is seriously debated at this time.

Oklahoma City pool is a fair example of how a pool should not be developed, operated and prorated. Considering that the other four major pools have had great success in conservative development, the results of Oklahoma City are most interesting. Local conditions in Oklahoma City were more difficult than elsewhere, but an agreement at an early date of development was possible, it was not achieved because conditions within the oil industry at that time (1929) were thought to be satisfactory.

BASIL B. ZAVOICO.

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Today's Condition in U. S. Oil Industry

(Continued from page 24)

TABLE 5

Suggested Course of Gasoline and Crude Oil Stocks From August 1930 to March 1931 to Insure Gasoline Inventories of 45 Million Barrels on March 31, 1931, and No Increase in Crude Oil Stocks

(In Millions of Barrels)

	Gasoline	Crude Oil
1930—September	38.3*	521*
October	37.0	521
November	38.2	521
December	40.3	521
1931—January	43.5	521
February	44.6	521
March	45.0	521

* Actual

TABLE 6

Relation of Imports of Total Supply of All Oils

Data From U. S. Bureau of Mines
(In Thousands of Barrels Per Day)

	Imports	Total Supply	Per Cent Imported
1925	214	2,384	9.0
1926	223	2,429	9.2
1927	197	2,778	7.1
1928	250	2,837	8.8
1929	295	3,209	9.3
1929 (9 months)	304	3,235	9.4
1930 (9 months)	298	2,970	10.0

TABLE 7

Imports of Crude Petroleum and Petroleum Products Into the United States, 1925-1930

Data from U. S. Bureau of Mines
(In Thousands of Barrels Per Day)

	Crude Petroleum	Gasoline	Other Petroleum Products	Total Imports
1925	169	10	35	214
1926	165	15	42	223
1927	160	14	23	197
1928	218	11	21	250
1929	216	24	57	297
1929 (first 9 months)	230	22	52	304
1930 (first 9 months)	175	49	74	298
1930 August	163	59	81	303
1930 September	194	51	69	314

TABLE 8

Comparison of Imports and Exports of Crude Petroleum and Petroleum Products, 1925-1930

Data From U. S. Bureau of Mines
(In Thousands of Barrels Per Day)

	Imports	Exports	Net Exports
1925	214	311	97
1926	223	360	137
1927	197	386	189
1928	250	423	173
1929	297	447	150
1929 (9 months)	304	435	131
1930 (9 months)	298	447	149
1930 August	303	483	180
1930 September	314	357	43

(Continued from bottom of previous column)

homa, 535,000; Texas, 719,000; and all other states, 451,000. A method of inventory control of gasoline is presented, which may be used as an operating guide without pre-determination of the demand for gasoline. The import situation is analyzed, and it is shown that while imports of crude petroleum have decreased, receipts of gasoline and fuel oil from abroad have increased; and that while 10 per cent of our total supply of oil is imported, 15 per cent is exported.

Respectively submitted,

COMMITTEE ON PETROLEUM ECONOMICS:
J, ELMER THOMAS,
Chairman (in absentia),
JOSEPH E. POGUE,
Acting Chairman and Secretary,
RAY M. COLLINS,
H. W. LOWRIE, JR.
H. P. GRIMM.

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Production Economies in Ecuador

DURING the past year considerable economies in drilling and other phases of production were effected by the Anglo-Ecuadorian Oilfields Ltd. Local labor was trained to do the drilling under white supervision, and 33 Polish drillers were shipped back to Poland. Yet the footage drilled was increased from the 142,000 feet in 1929 to 180,000 feet in 1930 and production increased from 1,200,000 bbl. to 1,326,000 bbl. of high grade oil averaging 40.4 degs. Beaumé. This was accomplished by centering activities in the shallow area of the Company's concessions, drilling wells in one-fourth of the time required for deep wells, and enabling four crews to drill the same footage previously obtained from six. Furthermore only 10 rigs were maintained in operation at one time compared with 18 in 1929. Production per well consequently was less, but the cost per barrel was lowered, which was found particularly advantageous with current low prices for crude. Casinghead gasoline was obtained from the newly installed compression system, which also was used for repressuring wells. As a result the Company made a better financial showing in 1930 than in the previous year. From its port at La Libertad was shipped one-and-a-quarter million bbl. of crude and refined petroleum products, and unloaded 10,200 tons of imported cargoes, and 1,800 tons of local cargoes.

U. S. SOVIET RUSSIA PRODUCTION REVIEW

WHEN the December issue of WORLD PETROLEUM closed for press the October crude production figures for U. S. Soviet Russia were not available. These were estimated at 11,750,000 bbl.. on the basis of 11,689,433 bbl. for September. However, the official returns for October amounted to 12,094,600 bbl., showing a considerable increase in production. Production for November was about the same. So far as these totals are concerned a conversion basis of seven 42-gallon barrels to the metric ton has been used to bring the figures in conformance with those of other countries. But, a basis of 7.25 bbl. per ton would be more accurate. Hence Russian production is somewhat higher than shown under world production figures elsewhere in these pages. The same applies to all countries whose totals are officially given in metric tons, and editorially converted to barrels at the rate of seven bbl. per ton for simplifying comparisons.

SEPTEMBER, 1930, being the last month of the fiscal year 1929/30 in Russia, shows the following figures of production and refining of crude oil and gas in metric tons.

	Crude Oil	Gas
Azneft	907,429	19,310
Grozneft	716,914	20,561
Embaneft	29,380	126
Uralneft	422	....
Sakhalinneft	11,834	....
Uzbekneft	3,940	201
	1,669,919	40,198

The above give the following ratio when compared to:

	Schedule	August	September 1929
Crude Oil	99.1%	100.1%	132.8%
Gas	113.6%	101.4%	164.1%

Drilling of wells accomplished during September by all the Oil Trusts amounted to 59,141 meters, which is 94.6% of the plan for the year, or 108.4% in comparison with August, and 143.7% compared with the drilling done in September, 1929.

TOTAL figures for the entire year 1929/30 present the follow picture:

	Drilling (in meters)	Production (in tons) Crude Oil	Gas	Refining (in tons)
Azneft	402,586	10,203,771	231,131	8,430,361
Grozneft	125,176	6,544,087	197,454	6,109,415
Embaneft	29,744	341,642	1,001	296,669
Uralneft	11,119	5,597	.....	.....
Sakhalinneft	5,532	71,312	.....	.....
Uzbekneft	6,859	39,158	21,764	21,764
Total	581,016	17,205,567	451,350	14,858 209

which are in % when compared:—

	To schedule	to 1928/29
Drilling	94.1%	130.3%
Production of crude	99.8%	126.6%
Production of Gas	101.4%	146.4%
Refining	102.0%	137.0%

THE Azneft has not fulfilled its production quota by 2.6% owing to the fact that the Surakhany fields were very much in arrears. The Lenin group of fields of the Azneft had completed its schedule 22 days ahead of time, and delivered an excess of 218,300 tons of crude oil. Bibi Eibat had completed its share 11 days ahead of schedule and produced an excess of 103,800 tons of crude. Bingadi completed its quota 8 days ahead, and produced an excess of 10,200 tons of crude oil.

The Grozneft in general completed its program 9 days ahead of schedule and produced an excess of 205,700 tons of oil. The Grozneft has thus fulfilled its program at the rate of 103.3%.

The Embaneft completed its quota by September 1st, and at the end of the fiscal year its total was 110% of schedule.

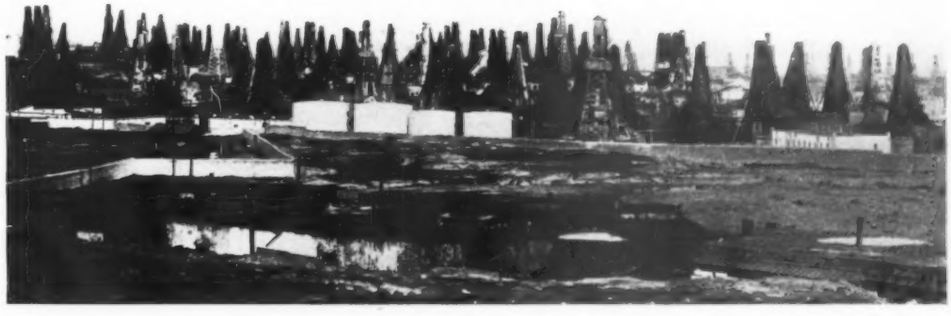
THE refining program of all Oil Trusts was successfully completed with 14,858,209 tons, which is 305,000 tons, or 2.1%, in excess of the schedule. The Trust of the interior plants (Neftezavodi) was 39 days ahead of its schedule, Azneft completed its task 9 days, and Grozneft 5 days, ahead of the scheduled time.

Production of gasoline calls for 1,680,000 tons. It has an arrear of 3.1%, but the production of kerosene with a total of 3,252,800 tons shows an excess of 0.4% over the quota. It is further reported that during the year the production cost of crude oil has been materially reduced, namely from 12.72 roubles per ton to 10.94 roubles per ton, which is a reduction of 14% against the expected 12%.

OCTOBER--December, 1930. This period is called the "shock term" for the Industries of Soviet Russia. It has been allowed in order to catch up with arrears in the schedules. Beginning from January 1st, 1930, the fiscal year of Russia will be the usual calendar year.

The Combine of the Oil & Gas Industries of U. S. Soviet Russia has notified the individual Oil Trusts that their working program for the term October-December will be as follows:

Production. The total for all Oil Trusts is 5,340,900 tons, exceeding the preceding quarter by 4.6%, and the quarter January-March by 36%. Of the



Part of the Bibi Eibat Oil Fields of the Azneft Oil Trust at Baku.

foregoing total Azneft will have to produce 2,917,300 tons, Grozneft 1,931,000 tons, Maikopneft 180,000 tons, Embaneft 93,800 tons, Sakhalinneft 47,000 tons, Uzbekneft 11,900 tons, Uralneft 5,000 tons and Turkmenneft 4,000 tons.

Refining. The total for all Trusts will be 4,700,000 tons, which is 60% more than the figures for last quarter. The increase of production of refinery products against the figures for last quarter will be the following: benzin-ligroin 23.4%, kerosene 18%, lubricating oil 15.8% and gasoil 63.3%. Of fuel-oil there will be a 10% reduction.

Out of the refined products 2,892,100 tons are set aside for internal consumption, and there was an increase against the last quarter of 9.2%. It consists mostly of kerosene, heavy lubricating oil and fuel-oil. The balance of 1,907,900 tons will be exported.

THE total capital investment for the entire industry during this term is set at 95,400,000 roubles. The quantity of crude oil to be produced in 1931 is 25,000,000 tons, or approximately 181,000,000 bbls., of which 22,000,000 tons are to be refined in Russia.

During this year a refinery at Khabarovsk will be built for refining of crude oil from Sakhalin. Plans for the same are at present being drawn, and provide for deep refining of the crude; a cracking unit will also be installed.

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World Oil Production

October, 1930

	(Revised) Barrels (7 Bbl. per ton)
United States (A.P.I.)	73,536,350
Venezuela (Official)	12,141,108
Russia & Sakhalin (Official)	12,094,600
Persia (Anglo-Persian)	4,081,686
Mexico (Official)	3,147,353
Roumania (Estimate)	3,000,000
Neth. East Indies & Sarawak*(Est.)	2,700,000
Colombia (Official)	1,725,809
British India (Estimate)	950,000
Peru (Official)	985,665
Trinidad (Official)	884,725
Argentine (Estimate)	800,000
Poland (Official)	414,400
Canada† (Official)	175,352
Japan & Taiwan (Estimate)	175,000
Egypt (Private)	156,709
Ecuador# (Official)	133,103
Iraq (Estimate)	50,000
Others(‡Germany, France, Czecho-Slovakia, etc., estimate)	170,000
Total	117,321,860

‡ Germany Jan.—Sept. total, 808,927 bbl.
* Sarawak (Official) 328,230 bbl.
† September (Official) 139,947.
# Anglo-Ecuadorian figures, 114,534 bbl.
Venezuelan production for October has been published in other journals as 11,784,591 bbl. but our figures are as given us by the Venezuelan Government.
Canadian production set a new high record.

THE State Planning Institute for the Oil Industries of Russia (Gyproneft) and the State Scientific Technical Council of Russia have jointly rejected the plan to build a pipeline for the transportation of crude oil from Grozny to Moscow. Both Institutes have decided that there will be no practical difference in the cost between carrying of crude oil from the Caspian Sea to Moscow by pipeline or by its transportation by tankers via the Volga river and the adjoining canal system. However, the Soyousneft (United Oil Industries of Russia) has approved of a plan to build a pipeline from Grozny to Ukraine for the transportation of refined products. The capacity will be 3,000,000 tons per year of tractor fuel which is a mixture of gasoline with kerosene. This quantity represents 50% of the refining capacity which Grozny will have by 1933 according to the construction program of the 5-Years Plan. The Grozny-Ukraine pipeline will have a length of 1,100 kilometers, and will be the first link of the Grozny-Moscow pipeline for the transportation of refined products.

The decision in favor of a pipeline for refined products has been carried for the following reasons:

(a.) Refinery losses are very high, often reaching 15%. The equivalent does not have to be transported in case of refined products.

(b.) The kinematic viscosity of refined products is much lower than that of crude oil, and therefore the transportation cost will be lower.

(c.) The refining of oil at its sources of production has many advantages over refining at remote points even at the points of consumption.

THE Grozny-Ukraine line will follow the existing crude-oil line Groxny-Touapse up to the depot at Vodorazdel, which will lower the maintenance cost of both lines. Between Grozny and Vodorazdel approximately 200,000 tons of refined products will be distributed. From Vodorazdel the line will turn north and take a short cut to Rostov/Don.

Between Vodorazdel and Rostov approx. 450,000 tons of refined products will be distributed, and the cities of Rostov and Bataisk will consume another 125,000 tons of refined oil. From Rostov the main line will follow to Nikitovka and Losovaya and a side line will be laid to Millerowo along the railroad line. The capacity of the side line will be 425,000 tons.

From Nikitovka the left shore of the river Don will have a distribution of approx. 450,000 to 475,000 tons of refined products, and the right shore of the river, the western district of the Ukraine and the entire district of White Russia, will get its distribution of products from Losovaya. The pumping station at Rostov is to be built on the left bank of the river Don, and a large tank farm will be erected at Nakhitchevan on the Don (a suburb town of Rostov).

J. WEGRIN.

Cracking Unit of Azneft Oil Trust Recently Completed at Baku

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World Oil Production

November, 1930

	Barrels (7 Bbl. per ton)
United States (A.P.I.)	68,639,150
Russia & Sakhalin (Official)	12,145,000
Venezuela (Private)	10,910,501
Persia (Anglo-Persian)	3,646,405
Roumania (Official)	2,975,000
Mexico* (Official)	2,894,759
Neth. East Indies & Sarawak (Est.)†	2,650,000
Colombia (Estimate)	1,700,000
Peru (Official)	958,881
British India (Estimate)	925,000
Argentine (Estimate)	825,000
Trinidad (Official)	794,887
Canada (Estimate)	180,000
Japan & Taiwan (Estimate)	175,000
Egypt (Private)	156,681
Ecuador (Official)#	131,754
Iraq (Estimate)	50,000
Others(Germany, France, Czecho-Slovakia etc.)	175,000
Total	109,933,018

Note—"Official" means government figures specially cabled. Some of the crudes being lighter than others, the totals in a few cases are slightly higher than the figures given in barrels, as several countries issue their figures in tons, or metric tons, and "World Petroleum" uses the conversion of 7 bbl. per ton.
* Mexico official estimate for 1930—40,704,591 bbl.
† Sarawak (Official) 335,650 bbl.
# Anglo-Ecuadorian 114,261.

FINANCE

New York

THE several days' rally in the general market list, referred to in our last month's comments, proved unable to maintain itself, and December's data reveals that more than a third of the issues included in the table made new lows for the year in the period covered. Further declines in oil prices, accentuating the prospects of year-end inventory losses, and also seasonally declining demand, have been especially unfavorable to the oils; while such general influences as the downward trend of investment bonds and preferreds in the face of continued easy credit conditions and the closing of the Bank of United States, one of New York City's important banking institutions, exerted an unsettling pressure.

Looking back over our monthly tabulations we find that the most recent to show a majority of plus signs covered the period from July 14 to August 2. While the prices recorded then were substantially below the year's high established in the Spring, present levels are in many cases less than half those figures and a third or less of the year's highs. Recent A. P. I. weekly statistics indicate further shutting in of crude production and a fairly good degree of success among the refiners in controlling their operations so as to keep gasoline stocks from mounting too rapidly during the winter season. Upon continued success in these efforts during the coming three months depends largely the hope of the industry for better prices and profits in the 1931 season.

IN line with Richfield Oil's retrenchment program involving cancellation of a large portion of company's crude oil purchasing contracts, recent action of directors in passing the quarterly dividend on the 7 per cent preferred due February 1 was not unexpected. The avowed purpose of conserving cash resources was attested by the latest income statement. Earnings for the nine months ended September 30, after interest and all other charges except Federal taxes, totaled $58,076, an amount quite inadequate for preferred dividend requirements of the period of about $525,000. For the similar period of 1929 net profit after all charges and Federal taxes, and not including Richfield Oil Company of New York, was $6,472,340.

FOR the year ended November 30, 1930 net earnings of Cities Service Company showed an increase of 41 per cent over the corresponding period a year ago. Net earnings were $58,781,452. The unbroken climb in net earnings now extends over 31 consecutive 12-month periods. The Company's net earnings for November, 1930, were $4,439,678 as compared with $4,314,815 for November, 1929. Net to Common Stock and Reserves for 1930 amounted to $42,503,959 or $1.43 per share on the average number of shares outstanding, an increase of more than 51 per cent over the previous year.

SINCLAIR CONSOLIDATED OIL CORPORATION will pay a 25-cent quarterly dividend on the common on January 15 to stock of record December 15, thus reducing the annual rate from $2 to $1 a share. Total disbursements for 1930, including the above, will be $1.75 a share, whereas earnings are expected to be less than $1 a share. Merger negotiations with Prairie Oil & Gas and Prairie Pipe Line were stated to have been abandoned due to inability to agree on satisfactory terms, but it was intimated that conversations with Tide Water Associated were still in progress.

HUMBLE OIL & REFINING, one of the important subsidiaries of Standard Oil Company (New Jersey), declared an extra dividend of 50 cents a share in addition to the regular quarterly 50-cent payment, both due January 1 to stock of record December 2. Total 1930 dividends received by the Jersey company from this subsidiary and Imperial Oil of Canada will equal approximately 92 cents a share on the parent company's outstanding capital stock. Thus close to half of the latter's 1930 $2 dividend payments will have been secured in cash from these two sources alone.

C. C. BAILEY.

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London: November-December.

SOME sharp fluctuations have taken place in the London oil share market during the past few weeks, but their cause has been the absence of regular business rather than pronounced ac-

New York Stock Prices

1930 High	1930 Low	Current Div. $ per Annum	Stock	November 17 to December 6 Sales (Shares)	First	High	Low	Last	Net Change
51⅝	18⅝	†2.00	Atlantic Refining (25)	49,200	23¼	23⅜	20	20	— 3
34	12⅝	2.00	Barnsdall "A" (25)	36,100	14⅞	15	14	14⅜	— ⅝
8¾	2¼	....	Colon Oil (No)	4,400	2½	2½	2¼	2¼	— ⅛
30½	10	....	Continental Oil (No)	84,200	12½	13	10⅞	11	— 1⅛
7⅝	3⅜	....	Creole Petroleum (No)	19,900	3¾	3⅞	3½	3¾	.....
166⅞	72	1.50	Gulf Oil Corp. (25)	18,200	79½	80¾	72	73	— 7
119	67¾	†2.50	Humble Oil & Ref. (25)	16,700	72½	72½	67¾	67¾	— 4¼
30	15⅞	$1.00	Imperial Oil, Ltd. (No)	23,800	17⅞	18½	16⅞	17⅞	— ⅜
28⅛	3¼	....	Indian Refining (10)	149,400	4	4⅝	3¾	4	— ⅛
24	13¾	1.00	International Petr. (No)	22,100	14⅜	15¼	14	14¾	+ ⅜
37	9¾	....	Mexican Seaboard (No)	59,500	13¼	15	12½	12¼	— 1⅜
32	16½	2.00	Ohio Oil (No)	74,900	20½	20½	17⅞	18½	— 1⅞
67½	41	....	Pan Amer. P. & T. B. (50)	2,400	42½	43½	42½	43	— 1
44¾	16¼	2.00	Phillips Petr. (No)	132,100	20¾	21	16¼	16⅝	— 4⅛
54	17	2.00	Prarie Oil & Gas (25)	25,200	21⅝	21⅝	17	17	— 4⅜
27¼	10½	....	Pure Oil (25)	27,300	11⅝	11¾	10½	10½	— 1
28¼	5⅞	....	Richfield Oil (No)	65,700	6¼	6⅞	6	7½	+ 1½
56½	37⅝	*3.20	Royal Dutch, N. Y. (13⅓)	61,300	40⅜	41⅝	37⅝	41½	— ⅜
25½	7½	1.00	Shell Union (No)	58,200	8¾	9	8¼	8⅝	.....
32	11⅜	2.00	Sinclair Consol. (No)	109,000	13½	13⅞	12½	12¼	— 1½
42	10¼	....	Skelly Oil (25)	13,100	15¼	16	12½	12½	— 2⅞
75	48⅝	*2.50	Standard Oil of Calif. (No)	59,000	51½	51½	48⅝	48⅞	— 2½
59⅞	35½	2.50	Standard Oil, Ind. (25)	112,500	38	38	36½	36¾	— 1⅛
40½	20⅛	†1.80	Standard Oil, Ky. (10)	48,900	23	24⅜	20⅞	23½	— 1⅛
84⅞	49	†2.00	Standard Oil, N. J. (25)	224,400	54	55½	51⅜	52¼	— 2⅝
40⅜	24¾	1.60	Standard Oil of N. Y. (25)	96,000	26½	26¼	24⅜	25¼	— 1
70	47⅜	§1.00	Sun Oil (No)	2,900	51½	55	47⅜	49½	— 1½
60½	35	3.00	Texas Corp. (25)	110,800	38⅞	39⅛	35⅜	35¾	— 2¾
17¾	7½	0.60	Tide Water Assoc. (No)	53,300	9	9	7½	8	— 1
50	25½	‡2.00	Union Oil of Calif. (25)	17,900	27	27¾	25½	25½	— 2½
97⅞	59½	†4.25	Vacuum Oil (25)	40,700	64	66½	62½	63¼	— 1⅝
4½	1⅛	....	Venezuelan Petr. (5)	2,800	1½	1⅝	1⅛	1⅜	— ⅛

[1] Since close of last month's table. * Paid last year—no regular rate. † Including extras. ‡ Plus 4% in stock. § Plus 9% in stock. ★ Plus 2% in stock.

tivity. The market has narrowed to a considerable extent, and the public is almost entirely absent, operations being left principally to professionals. In these circumstances, dealers make wide prices, and adjust their quotations rapidly to any excess of either buying or selling. Towards the end of November many leaders touched their lowest levels for the past decade, following unfavorable news as to prices in United States. Paris assisted in the decline, financial trouble in that centre leading to large sales in London of Shells, Eagles and other French favorites.

Since then a better tone has supervened, low prices attracting some "bargain hunting," while bear closing was induced by the maintenance of interim dividends by leading companies and a sharp decline in United States production. The statement of Sir Henri Deterding on Royal Dutch Shell prospects also provided considerable encouragement. Share quotations, however, are mostly lower on balance, two exceptions being Lobitos and Trinidad Leaseholds. The first named responded to the larger earnings shown by Anglo-Ecuadorian, the subsidiary undertaking, while Leaseholds, after falling to £1 on the statements in the report, rose sharply subsequent to the meeting. Deduction of the amount of the interim dividend from price accounts partly for the heavy decline in Burmahs. Fear of damage to the property by the earthquake may also be responsible, although the company's statement that the fields and plants were unaffected produced only a trifling improvement.

ONE of the favorable market factors of recent weeks has been the knowledge that three of the most important oil companies known in London were to pay the same interim dividends as a year ago. The companies were the Shell Transport, Royal Dutch and Anglo-Persian, and the distributions are 10 per cent tax free, 10 per cent, and 5 per cent respectively. Shell Transport paid 25 per cent free of income tax for the whole of 1929, and its senior associate, the Royal Dutch, 24 per cent. Anglo-Persian distributed a total of 20 per cent for the year to March 31, 1930. The Burmah Oil Company, which has already announced the same interim as a year ago, is interested as a large shareholder in the Anglo-Persian distribution. Another interested party is, of course, the British Government, which holds 7,500,000 Anglo-Persian ordinary shares. The market had not anticipated a reduction in any of the payments mentioned, but was nevertheless relieved at having its hopes confirmed. In view of the conservative dividend policy usually pursued by the respective boards of the three companies, maintenance of interim payments was taken to indicate that financial strength is still acting as a protection against the effect of decreased operating revenue. Shell, Royal Dutch and Anglo-Persian all showed excellent results for their last financial year, and the market is now beginning to hope that if total profits for the current accounting period show declines, no paring of dividends will be necessary.

Sir Henri Deterding is an excellent head for a big oil group, apart from his great administrative capacity. He always has something cheerful to say, and up to the present the Royal Dutch Company has always justified his optimism. The adjourned meeting of the company, held last month in Amsterdam, gave him an opportunity of disposing of several rumors regarding the Royal Dutch Shell Group's finances and prospects. His principal points can be summarized as follows:

There is no truth in the report that the dividend can only be paid from the proceeds of this year's bond issue.

Part of the 4% priority loan not offered for conversion was paid off on November 1 from the company's cash balances, the amount so dealt with being about £650,000.

An offer of a £25,000,000 loan on 4% bonds from bankers had been turned down by one company, because it already has a surplus of funds.

Capitalization of the company is remarkably conservative.

Permanent holders of the shares have always been justified in sticking to their investment.

Petroleum is the most economic source of light and energy.

Difficult conditions have the advantage of compelling economy and showing which are the sound and efficient concerns.

The enormous stocks held by subsidiaries are conservatively valued in balance sheets.

The directors' formal proposals to adjust the capital by the amount of the priority shares exchanged into debentures last March, at the same time restoring the authorized capital to the original figure of Fl. 1,000,000,000, was duly passed at the meeting. As is usual when Sir Henri Deterding addresses shareholders, Shell, Royal Dutch and other shares took a sharp upward turn as a result of his speech.

ROYAL Dutch—Shell activities have attracted a good deal of market attention, particularly in relation to Venezuela. Reports from Amsterdam indicated the Group's intention of transferring five of its tankers in Venezuelan waters to Europe and Singapore, which is in line with recent reduced production in the Caribbean.

TRANSFERS of Royal Dutch-Shell tankers eastward is possibly connected with the opening at the end of November of the new Shell ocean installation at Haifa, Palestine. This installation occupies twenty-five acres, with

London Stock Exchange Prices

1930 High	1930 Low	Last Year's Div. % per Ann.	Share	November 8 to December 5 First	High	Low	Last	Change
1 1/32	1/2	3 1/2	Anglo-Ecuadorian	19/32	5/8	1/2	17/32†	— 1/16
2 5/8	1 3/4	22 1/2	Anglo-Egyptian "B"	1 15/16	1 15/16	1 3/4	1 27/32	— 3/32
4 23/32	2 27/32	20	Anglo-Persian	3	3 1/8	2 27/32	2 31/32	— 1/32
1 13/32	9/16	52 1/2	Apex Trinidad (5s.)	23/32	3/4	9/16	19/32	— 3/8
2	7/8	....	Attock	1 1/16	1 1/16	31/32	1	— 1/16
5/8	9/32	12 1/2	Brit. Borneo (10s.)	5/16	5/16	9/32	9/32	— 1/32
11/32	3/16	6 3/4‡	Brit. Burmah (8s.)	7/32	7/32	7/32	7/32	.....
1/4	1/16	....	Brit. Controlled ($5)	1/16	3/32	1/16	1/16	.....
3/8	5/32	....	Brit. Controlled Pfd. ($5)	3/16	7/32	5/32	3/16	.....
4 21/32	3 15/32	30	Burmah	4	4 1/16	3 15/32	3 19/32†	— 13/32
11/16	11/32	12c.	Canadian Eagle (No par)	13/32	13/32	11/32	3/8	— 1/32
1 1/2	11/16	....	Creole Petrol. (No par)	13/16	13/16	11/16	3/4	— 1/16
5/16	1/8	....	Kern River (10s.)	5/32	5/32	5/32	5/32	.....
2 21/32	1 1/4	12 1/2	Lobitos	1 11/32	1 15/32	1 1/4	1 13/32	+ 1/16
3/4	5/16	6	Mexican Eagle ($4 Mex.)	7/16	7/16	5/16	3/8	— 1/16
68	40	....	Pan American "B"($50)	48 1/2	48 1/2	40	44	— 4 1/2
11/16	5/16	5	Phoenix	13/32	13/32	5/16	3/8	— 1/32
35 1/4	23 15/16	24	Royal Dutch (fl. 100)	27 3/4	27 3/4	23 15/16	26 1/8	— 1 1/2
4 21/32	3 17/32	25‡	Shell Transport	4 1/16	4 3/32	3 17/32	3 27/32	— 7/32
1/2	1/4	4	Steaua Romana	5/16	5/16	1/4	5/16	.....
3 3/8	1	7 1/2	Trinidad Leasehold	1 1/4	1 3/8	1	1 1/16	+ 1/16
3/8	3/16	....	Untd. Brit. of Trinidad (6s.8d.)	9/32	9/32	7/32	7/32	— 1/16
3 1/16	1 7/16	20	Venezuelan Oil Concessions	1 25/32	1 25/32	1 7/16	1 5/8	— 5/32

Nominal value of shares £1 unless otherwise indicated by bracketed figures.
‡ Denotes tax-free dividend. † Denotes "ex-dividend" price.
c. Denotes cents per share

tank storage capacity of over six million gallons. Tanks are connected with the sea by pipe lines more than a mile long, running for about half their total length along the bottom of Haifa Bay. The necessity for such an installation demonstrates the development of Palestine under the plans for immigration of a Jewish population. Since 1920 the consumption of kerosene and benzine in Palestine and Transjordania has increased by more than 500 per cent. In another connection the Shell development at Haifa may have significance, for the port has been marked out as one of the two terminations of the pipeline from the Iraq oilfields to the sea. The Royal Dutch-Shell, through the Anglo-Saxon Petroleum Company, has a 23¾ per cent interest in the Iraq Petroleum Company.

ANNOUNCING their intention of closing the company's accounts on December 31 instead of July 31, the directors of British Controlled Oilfields state that total production for the twelve months to July 31 last was 2,714,985 bbl. compared with 2,601,374 bbl. for 1928-29. Gross profit, however, was £44,207 lower at £395,864, the reduction being attributed mainly to higher freight rates. Depreciation allowance of £246,000 will have to be deducted, this being on the same basis as for the year to July 31, 1929. Calculating the net profit figure at £149,864, there would be a credit at profit and loss account at July 31 last of £1,394,539. Sanction has since been given to the capital reduction scheme, whereby $22,512,830 (Canadian) was written off as being unrepresented by assets. The preference shares now have a fixed 7 per cent dividend, with a further participating dividend up to a limit of 13 per cent, making a maximum of 20 per cent in any one year. Accounts for the period of seventeen months to the end of 1929 are to be submitted next April. Although the company was formed in Canada twelve years ago, it has never yet paid a dividend on either class of capital. Suggestions of mismanagement some years ago led to a reorganization of the directorate, and the shares came into the limelight again in 1927 owing to the speculative operations which culminated in the death of James White, the financier and sportsman. They have since stood practically at rubbish levels.

ANGLO-ECUADORIAN £1 shares relapsed after the declaration of a dividend of only 3½ per cent for the year to June 30, 1930. The dividend was the same as that for 1928-29, but the market had been going for something more, despite general oil industry depression, owing to the fact that the company, being still partly in the development stage, had increased its output considerably. A better complexion was put on the position by the subsequently issued annual report, showing profits up £36,284 to £104,115, a transfer of £23,456 to development account, and the carry forward increased by about £40,000. The chairman, Lord Forres, was naturally unable to make any definite forecast regarding immediate prospects, but pointed out that, unlike its parent undertaking, Lobitos Oilfields, the company may avoid some of the worst effects of the current slump in prices for petroleum products. Due control is being exercised over the company's productive capacity, and, as the restriction to the past year's dividend indicates, equal care is being paid to maintaining its financial position.

A REDUCTION of £19,414 to £136,404 in profits of British Burmah Petroleum Company for the twelve months to July 31 is attributed to the fact that the Indian Government, while increasing the excise duty on indigenous kerosene, has reduced the duty on the imported product. The directors are reducing the tax free dividend from 7½d. to 6½d. per 8s. share, but maintain the reserve transfer at £15,000, although this entails a reduction in the undivided surplus. Production of crude again declined, despite attempts to offset this by drilling the remaining proved area owned directly by the company. Improvement in results must now be dependent largely on the success achieved by the companies formed by the British Burmah in conjunction with other interests to exploit surrounding areas.

STEAUA ROMANA (British), whose accounts were issued last month, is a company which presents a number of unusual features. One of the most curious is the fact that it increased its profits last financial year to June 30 from £109,913 to £133,131, paid 4 per cent on its ordinary capital for the fifth year in succession, and transferred another £25,000 to reserve account. Although its shares are quoted in the oil share market, this concern is in reality a finance and investment company, having no oil lands of its own. The capital structure is remarkable, £2,000,000 of ordinary capital carrying a cumulative preferential dividend of 8 per cent, and the £25,000 of deferred 1s. shares a cumulative dividend of 160 per cent, subject to the ordinary distribution. Of surplus profits, four-fifths go to the ordinary. There is now a total of 44 per cent dividend arrears on the latter. The company's capital is invested, by way of shareholdings and loans, in Steaua Romana Société Anonyme pour l'Industrie du Petrol, and it is the remarkable increase in production of the latter which has provided it with a larger income. Recent steps to restrict production in Roumania may, of course, have completely changed the immediate outlook for the operating company during the current financial year.

A. H. DAY.

▼

Paris

THE French stock market is literally staggering under the blows it has received since the early part of November last. One failure has followed upon the heels of another and all shares, without exception, are falling, especially those of a more speculative nature. The smash of the OUSTRIC Bank is having widespread financial and political effects, and is becoming a public scandal. Under the circumstances the lack of confidence shown by prospective investors is justifiable. There is one bright spot however amidst so much gloom, namely the decided attitude of the French shareholder who is determined not to lose his head entirely and aggravate the situation by selling at any price.

OIL shares have been particularly affected by the prevailing situation and the greatest anxiety has been felt as to the fate of the Credit General Des Petroles, Malopolska, etc. — belonging to the Dewilder group, and operating in Poland—who, it was rumored, would be unable to face their liabilities on the 30th of November. The difficulties which these companies have to face were brought about by the heavy losses sustained by the DEWILDER group owing to their speculative investments.

RATHER than face the consequences of another smash the French Government is said to have intervened in favor of the Credit General Des Petroles, and to have requested the C. F. P. to take over the company. This it refused to do for different reasons, and another solution to the problem had to be found. As yet nothing official is known, but I can state on excellent authority that the three leading French financial Syndicates, namely the "Agents

de Change," "Banquiers des Valeurs au Comptant," and the "Banquiers des Valeurs à Terme" have taken over the positions, thus momentarily saving the situation.—

. . . "*Momentarily* saving the situation" seems about to meet the case, for although the present crisis has nothing to do with the position of these French companies operating in Poland, they have several very serious problems to face. Production has been on the decline for several years, but at a time when it was expected to increase it by the opening up of new fields, several millions of francs were recklessly spent upon refining plants which now have very little or no oil to refine, upon tanks, offices, and houses for the staff, which are for the most part standing empty, and are so situated that it is almost impossible to exploit them for any purpose whatsoever.

THUS the millions spent cannot be retrieved, and it is because of this, of other mistakes, and the general situation of the oil industry that the Credit General des Petrole and other companies are in such a bad way.

THE demand for the 110,400 new B shares issued during October by the C. F. P. in order to increase the company's capital by 55 million 200 thousand francs was good. Ninety-four per cent of the shares offered were disposed of to former shareholders, and the remaining 6% were very soon oversubscribed. This, in face of the fact that the ratification of the Agreement between the State and the C. F. P. has not yet taken place, proves the unshakeable faith of the shareholders in the future of the undertaking. On the other hand the C. F. P. may well be proud of the fact that during the last month the company's shares have only fallen six points on the Paris Bourse; this compares extremely favorably with all the other companies, and notably with the more important ones.

THERE have been further reductions in the price of petrol this month, in fact complete anarchy reigns on the market, particularly in the North where competition is becoming cut-throat. This is caused by the holders of small importing licenses in this district being able to procure oil from Belgium at extremely favorable rates and have been under-cutting in a drastic way. The big importing and distributing companies have retaliated and a price war is in full swing. Losses are evaluated at several million francs each month. This is also one of the reasons for which the shares of the distributing companies such as the Cie Industrielle des Pétrole, the S. Générale des Huiles de Pétrole, Lille Bonnières & Colombes, etc., are rapidly falling, whereas they generally contrive to remain steady, whatever the situation may be.

Paris Bourse Prices

Div.	Par	Share	Price on Oct. 30	High	Low	Closing Pr. 30 Nov.	Change
50 lei	500 lei	Astra Romana	122	122	91	95	—27
50 lei	500 lei	Colombia	97	103	69	73	—24
50 lei	500 lei	Concordia	86	86	67	67	—19
50 lei	500 Frs.	Cdré. Gal des Pétroles act	plus coté	....	....	....	....
50 lei	500 Frs.	Cdré. Gal des Pétroles part	6510	6510	4200	....	....
50 lei	500 Frs.	Franco Pol. Pétroles act	91	91	58	58	—33
		Franco Pol. Pétroles part	340	340	335	....	....
1 Frs.	10 Frs.	Franco Wyoming	406	406	328	354	—52
20 Frs.	500 Frs.	S. G. des Huiles de Pétrole act	514	514	470	475	—39
20 Frs.	500 Frs.	" " part	226	226	180	185	—41
20 Frs.	500 Frs.	C. Française des Pétroles	....	586	580	580	— 6
50 Frs.	500 Frs.	C. Industrielle des Pétroles	950	960	830	830	—120
65 Frs.	500 Frs.	Lille Bonnières Colombes prio	1005	1005	950	970	—35
40 Frs.	500 Frs.	" " ord	684	684	590	608	—76
40 Frs.	500 Frs.	Malopolska act	190	190	98	98	—92
40 Frs.	500 Frs.	Malopolska part	1755	1755	1475	....	....
..	..	Mexican Eagle	57	57	45	45	—12
17.50	250 Frs.	Omnium Inter. des Pétroles	129	129	102	102	—27
50 Frs.	500 Frs.	Péchelbronn	875	875	810	810	—65
60 F.B.	500 F.B.	Pétrofina	516	516	475	485	—31
240 Frs.	1000 Frs.	Royal Dutch	34560	34560	29600	31000	—3560
24 Frs.	100 Frs.	Royal Dutch 1/10	3465	3480	2965	3115	—350
5 sh.	1 Lg.	Shell	515	515	448	463	—52
25 Frs.	500 Frs.	Steaua Française	165	165	105	124	—41

THE shares of the S. A. Colombia were quoted Frs. 73 on November 30th, as against Frs. 97 on October the 30th, but they have no bearing with the present financial situation of the company, whose reserves and liquid assets are almost equal to the share capital. Colombia ranked ninth amongst Roumanian producing companies with a production of 177,116 bbl. in October. Total footage drilled amounted to 2,700 feet during the same month. The Company owns a refinery at Ploesti, and was the first Roumanian company to erect a cracking plant in that country.

STOCKHOLDERS of the S. A. Sylva Plana were to have met on the 18th of November, but the Assembly could not be held on account of the absence of quorum. In spite of this, those present examined the possibility of increasing the company's capital by 8,000,000 Frs., i. e., from 178,812,500 to 186,812,500 Frs., by an issue of 80,000 new shares of Frs. 100 each. These will be issued for the express purpose of covering debts and rights. The company's balance sheet shows a net profit of Frs. 4,861,000 on December 31st, 1929, whereas in 1928 profits amounted to 10,455,000 Frs.

Sylva Plana's position is not enviable at the moment; at one time its activities in Poland were very great, but when production diminished it had to turn its attention to more productive sites. Thus the Roumanian company S. A. Reneastera was absorbed, but the venture has not proved very fortunate. Sylva Plana's shares are quoted Frs. 40 on the stock market, whereas in better times they attained Frs. 275 and sometimes more.

E. J. ANDRÉ.

Mexican Notes

ALTHOUGH President Pascual Ortiz Rubio has suggested that the import levy on gasoline be raised to five centavos (about 2½ cts., U. S.) per liter in the new tariff laws, effective for 1931, strong sentiment prevails in the national chamber of deputies to make the tax six centavos (about three cents). The legislators contend that the higher tariff will be more protective for Mexican gasoline producers, but declare that if these producers take advantage of the protective duty to increase their prices, the levy will be lowered.

Crude oil production in Mexico during 1930 approximated 40,000,000 bbl., or 4,687,877 bbl. less than the estimate made in 1929 by the Petroleum Department of the Ministry of Industry, Commerce and Labor. This approximate figure is an estimate based on the production from January to September, 1930, inclusive, namely 30,565,821 bbl. This is a drop of 2,324,081 bbl. from the January-September, 1929, period. Gasoline consumption in Mexico during the first nine months of 1930 was 1,611,158 bbl. as compared with 1,322,354 bbl. in 1929. The great increase is contributed to an expansion of Mexican national highways, and the increasing popularity of automobiles.

DOUGLAS GRAHAME.

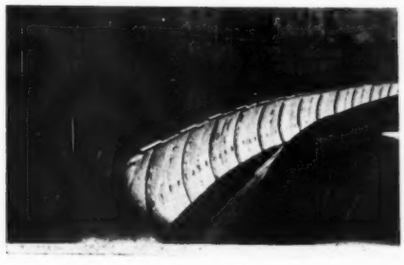
New Equipment and Engineering Information

Floating Deck for Oil Tanks

THE two illustrations accompanying this paragraph are views of the sealing device in one of two tanks built for Texas Empire Pipe Line Co., at Bunceton, Mo., by Columbian Steel Tank Co.

These tanks are 117′ in diameter and hold 80,000 barrels; the deck is designed for protection against evaporation and fire.

The deck itself is of the common floating-pan type and is 16 inches smaller in diameter than the tank. The eight inch clearance space is sealed by shoes, one of the ends of which is hinged to a rim header on the rafters forming the deck floor frame, as indicated in Fig. 1. Inside this trough-shaped space are placed gravel carriers which exert the necessary outward pressure on the shoes causing them to adjust themselves to the irregularities of the shell. The arrangement is completed by laying shingle plates over the top of the gravel as shown in Fig. 2. This deflects rain water to the deck, from which the water is drained off through a sump in the center.



Mud Weight Recorder Gauge

THE problem of mud control is assuming increasingly serious proportions in fields where gas conditions require the exercise of ingenuity to keep the drill stem in the hole. According to the Specialty Oil Tool Co., the Sotco mud weight recorder has been thoroughly field tested and proved practical by months of constant service under widely varying conditions. They explain that it enables the operator to keep a constant and accurate check on the weight of mud fluid being circulated in the well, enables the driller to keep his mud accurately at any predetermined weight, and warns him of many dangers which are difficult to detect with the most conscientious practice.

The device consists of two main parts —a pressure element and a recording element. It can be installed in a few minutes and needs no special supports.

Building Pipe-Line Trenches

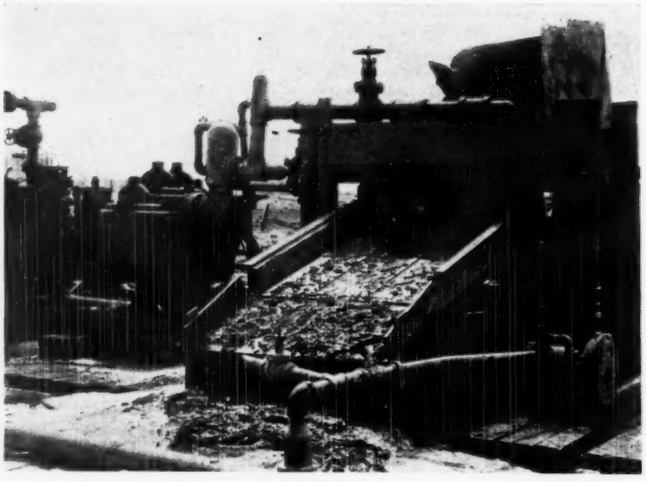
DIGGING pipe line trenches requires a trenching machine that will work in all sorts of ground, from the softest to the most difficult and hardest of materials, and it should work economically and fast. The Speeder trench pull-shovel made by Bartlett-Osterhout Co. is a back-action machine which can dig a 22, 26, or 30 inch ditch to a depth of 17½ feet. The bucket is drawn toward the machine, which backs away as the work progresses; mats are therefore unnecessary and there is no danger of a cave-in. The output may be as much as four buckets per minute, depending on conditions. In firm soil the boom and dipper arm may be worked up and down in the manner of a pick.

Improved Return Bend

AN old saying around a power plant is that nobody loves a steam trap; and there is equally little love lost on the ordinary type of return bend. The Ohio Steel Foundry Co. made an improvement in return bends some time ago when they developed the earlier types (A and B) of Ohio lock closures, but the more recent types, A_1, and A_2, carry the frictionless feature to an even greater extent. The new bends are of true steam line flow, but the main idea is that, instead of two tapered joints there are now provided a ball and cone arrangement which makes a true line contact that is leak proof under high temperatures and pressures, with no possibility of sticking at cleaning time.

Reducing and Back Pressure Valve

WITH the widespread interest in hydrogenation, high temperature cracking, and refining as well as many other advanced industrial processes employing high temperature with either high or low pressure, it became urgent to develop both a reducing and a back pressure regulator which might be more easily packed off against leakage. Through the use of a rotary stem at the point where it passes through the stuffing box the Neilan Co., Ltd., manufacturers of automatic regulating and controlling equipment, have achieved a value which is exceptionally easy to keep tightly packed even under severe conditions. Special types of stuffing boxes are furnished for different operating conditions. Friction is eliminated by means of stainless steel ball bearings.



Cleaning Mud Fluid

CLEAN mud fluid, or clean mud means a mud that is free from rough cuttings or sand. These foreign particles when circulated through the mud system work havoc with pump liners and valves, may plug up the drill bit, and if they are present in any considerable quantity may stick the tools in the hole. In addition, when gas is present the mud becomes "gas cut," and unless the gas is removed from the mud before it is re-circulated, the weight per gallon is reduced, and must be thrown away or doctored up. Link-Belt Company has recently introduced into the oil fields a mud cleaning device that is new to the oil industry. It consists of a screen deck carried in a screen box, to which a vibrating motion is imported. The machine is set up at a convenient place outside of the derrick in such a manner that the mud fluid is delivered along the top edge of the screen. The good fluid passes through this screen into a trench through which it passes to the pump sump. The coarse rejects fall off the lower end of the screen into a reject pit, and the gas, if any is present, escapes into the air during the screening operation.

The illustration shows a Link-Belt vibrating screen used by the Humble Oil & Refining Co., in the Hobbs, N. M., field, for salvaging mud from old pits. At the time this photograph was taken, between $10,000 and $15,000 worth of mud had been salvaged. Notice the cuttings in the foreground.

New Welding Process

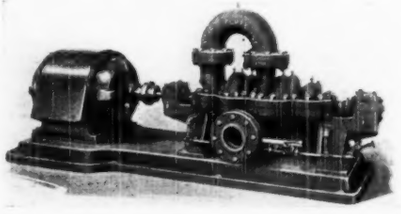
A NEW method of oxy-acetylene welding known as the Lindeweld process has been introduced by The Linde Air Products Company, and has met with success in the field of overland pipe line construction. Although used at present chiefly for the welding of pipe, future developments are expected to lead to its application in many other welding operations.

In the welding of pipe for oil and gas transmission savings are claimed from 30 to 60 per cent of the time required to make a weld by methods previously employed. Oxygen and acetylene consumption have also been reduced.

High strength welds are obtained and no sacrifice of quality has been made for the benefit of increased speed. In tensile tests made in the field on specimens welded by the Lindeweld process, the welds have invariably outpulled the pipe. Good ductility has also been shown in bend tests. More than 300 miles of high pressure pipe line welded by this process are now in the ground.

Pipe Line Pump

GOULDS PUMPS, INC., are furnishing the oil industry with a very high head type of multi-stage centrifugal pump

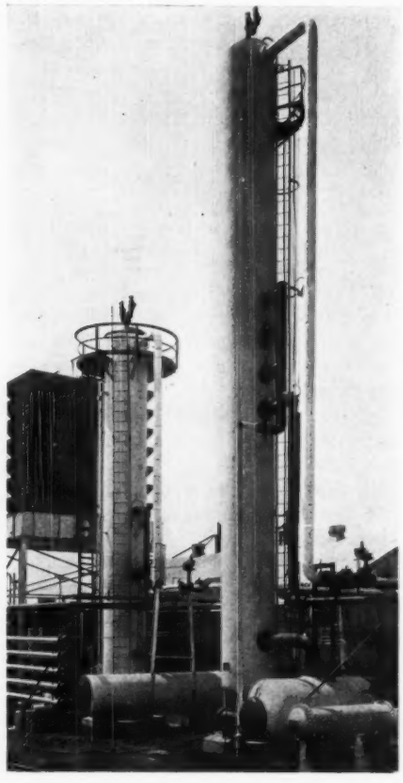


developing pressures greatly in excess of most centrifugal pumps and suitable for services formerly covered only by the reciprocating type of pump. This pump has ball bearings which makes it possible to have lower rubbing speeds, lighter and more compact casing, small shaft, lower rubbing speeds and closer clearances. The impellers are opposed to each other, which gives nearly perfect hydraulic balance, eliminates end thrust and reduces pressures at the stuffing boxes to low values. This pump is performing satisfactorily on oil pipe lines.

Unusual Vapor Recovery Plant

A RADICAL departure in vapor recovery has been made at the Kanotex Refinery at Arkansas City, Kansas. The pressure distillate from the cracking plant here is high in butane and lighter components and there is a regular production of gasoline blended with casinghead gasoline that requires the removal of propane and lighter components, and butane in excess of specifications.

The plant, (see illustration) which was constructed by Petroleum Engineering, Inc., comprises three main functions: to debutanize the pressure distillate; to recover the gasoline content of the refinery vapors, and to stabilize the gasoline production. The pressure distillate is first topped in a fractionating column, removing all the butane and lighter products and leaving a stable distillate. The overhead products are condensed and mixed in the stabilizer feed. The refinery vapors are compressed in two stages, with intercooling in the intermediate stage to condense the heavier vapors for stabilizer feed. In the second stage the vapors are compressed to 300 pounds and discharged directly into the stabilizer, where they are stripped of all the desired gasoline content. The stabilizer is a 48 inch bubble tray column designed for pressures of 300 pounds, with steam heated reboiler and exchanger.

The plant is equipped with controls and temperature indicators; one operator can supervise its operation.

Dr. O. W. WILLCOX